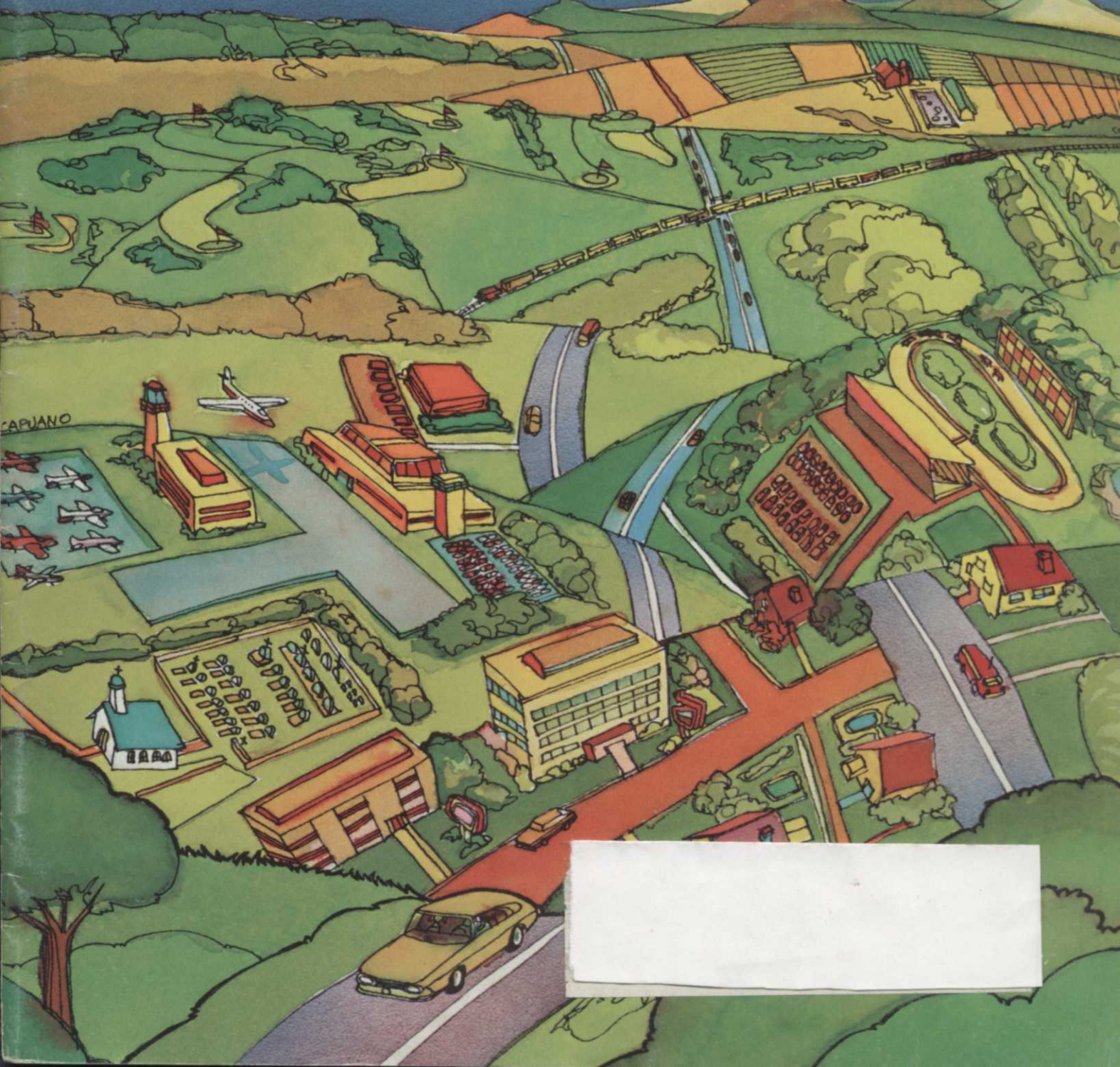
WEEDS TREES & TURF

ONE DOLLAR • FEBRUARY 1977

FERTILIZER—blended vs. granulated, the non-farm market today
THATCH—a barrier to insect pests
PESTICIDES—getting the most for your money



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FEBRUARY 1977, Vol. 16, No. 2

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ON THE COVER: A graphic illustration of the Green Industry.

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TO OUR READERS —

I have always had the feeling that climatic variations, regional problems and techniques were minimal differences when compared to the common goals and interests of the Green Industry. But this morning I'm not so sure. I'm having a hard time relating to those of you who live and work in the Sun-Belt.

We have been putting together this issue of WEEDS TREES & TURF in record cold. Last night the temperature dropped to 21 below and the expected high today is zero.

Schools have closed, some industries have shut down temporarily because of natural gas curtailments. The snow crackles as you walk. Hands and face go numb as you wait for the car heater to warm up. But this is our deadline week and neither sleet nor rain. . . .

This month's cover says it all — our Green Industry as it is today. The illustration was done by talented Cleveland artist Sam Capuano. If you look carefully you'll see golf courses, cemeteries, schools, parks, rights-of-way areas, airports, utilities, the whole gamut. And our February issue practically covers the whole gamut of professional applications.

First, we take a hard look at the specialty fertilizer market today. In Washington, Don Collins, vp for the Fertilizer Institute, told me the future looks good for the specialty fertilizer industry. As turf managers become more sophisticated they are demanding better fertilizers and getting them. But he does see possible problems in the areas of supply. See story on page 32.

Speaking of fertilizer you'll want to read Roger Brown's outstanding article on blended versus granulated on page 24. Brown told WEEDS TREES & TURF: "I've been connected with the turf chemical and fertilizer industry for 25 years. I've been employed by fertilizer manufacturers on both sides of the fence and there is considerable confusion. I believe this article will help many professional turf people make a fair judgement."

When it comes to the pesticide market, George Kozelnicky of the University of Georgia is the man to know. He tells us he thinks of pesticides as plant protectants. On page 42 he gives some practical advice on how to save money with protectants.

Last month we told you about the most successful Ohio Turfgrass Conference. One featured speaker was Dr. Harry Niemczyk of the Ohio Agricultural Research and Development Center who presented some enlightening information on thatch. He graciously agreed to prepare this information and more for WEEDS TREES & TURF. Some major new developments have taken place in the area of thatch as a barrier to insecticide effectiveness. But find out for yourself on page 16.

Our market looks strong and ever-changing, but this adds to the excitement. The best thing I've read this month about the future is the Crystal Ball Committee Report of the American Landscape Contractors Association. The report predicts the emergence of the Environmental landscaper, who will handle the big jobs resulting from ever-increasing regulations to protect the environment . . . mining revegetation, rights-of-way maintenance work . . . The report is mentioned in our Industry News on page 12. It's well worth the investment.

Things are looking brighter now that I write about the positive aspects of the business. The snows will melt, the ground will thaw and hopefully we cold-weather dwellers will survive for spring, the season of lawn care specialists. But that's another story and one we'll cover in full in March.

Gail D. Hogan

THE E-Z-GO MAINTENANCE MACHINE

Here's why the rugged E-Z-GO GT-7 Truck is a vital part of any efficient maintenance system.

The GT-7's large 50 cubic inch gasoline air-cooled engine can carry a 1500 pound payload up to 30 mph. With this flexible maintenance machine and auxiliary equipment, you can haul, mow, spray, and spread. The dump body is up to 30% larger than most other three wheel turf vehicles.

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Whatever the work, on golf courses or on campus, in parks or in industry, the E-Z-GO GT-7 Truck is a versatile component to a modern maintenance program. Today, when more than ever people are searching for value, E-Z-GO makes good sense.

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Government News

A case involving inferior grass seed which was called to federal attention beginning in 1971 by Maryland Turf and Seed officials has been settled in an Illinois U.S. District Court.

Maurice H. Day, Chief of the Maryland Department of Agriculture's Turf and Seed Regulatory Section, says that the Seaboard Seed Company of Briston, Illinois, paid a $2,750 settlement to end the case which was brought against it by USDA's Agricultural Marketing Service.

Ray Brush, of the American Association of Nurserymen, spent 8 hours on the witness stand defending nursery uses of chlordane and heptachlor in testimony at pesticide cancellation hearings convened by the Environmental Defense Fund.

Attorneys for Velsicol Chemical and the United States Department of Agriculture aided Brush in preparing his testimony. The hearings have not been completed.

Responding to a voluntary request from Hooker Chemicals and Plastics Corp. of New York, the EPA has proposed to officially end all U.S. sale of a chemical compound called BHC or benzene hexachloride which is common used in making pesticide products.

Hooker requested the EPA sales prohibition, technically called a cancellation of registration, in September 1976 after learning that EPA was evaluating BHC's environmental and human health effects. Hooker said it had actually stopped making the BHC pesticide ingredient, known as "technical grade" material, 4 months earlier.

OSHA has revised its directive concerning methods of guarding workers from physical contact with the point of operation of power press brakes. (A point of operation is the area of a machine where work is actually performed upon the material being processed.)

OSHA requires use of guarding devices to prevent a worker from having any part of his body in the point of operation while the machine is running. When guarding devices cannot be installed, alternate protective measures must be used. Such alternate measures include methods of keeping the worker at a safe distance from the point of operation.

The EPA has issued a list of agricultural pesticides that are candidates for restricted use only by farmers and others that have shown they can safely handle and apply them.

Under the 1972 Federal pesticides law, the application of restricted use pesticides will be limited only to certified applicators or persons working under their supervision. This program will take effect on October 21, 1977.

A proposed job health standard that would reduce worker exposure to cotton dust has been announced by OSHA. OSHA also announced that a public hearing on the proposal will begin April 5, 1977.

The proposal would reduce the present OSHA standard (1,000 micrograms of total dust per cubic meter of air) to 200 micrograms of respirable dust per cubic meter of air measured by a vertical elutriator. Respirable dust is proposed as the measure since larger, non-respirable dust particles are not thought to be harmful.

FOR MICKEY MANTLE AND WHITEY FORD, IT'S "A WHOLE NEW BALL GAME"...

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KENTUCKY BLUEGRASS
(U.S. Plant Patent No. 3150)

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THE
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IN TURF.

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For control of broadleaf weeds in turf, including golf courses, park grounds, and other non-crop turf areas.
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How to protect your turf from the world's toughest critic: the golfer.

With this formidable array of armament on your side, you have a broad spectrum turf management program that can ward off just about any attack from weeds or fungi or golfers.

And you can manage it all with surprising economy. Chipco® products protect the green of your turf without straining the green in your budget.

Just try any one of them, and you'll want the entire arsenal. Because once you use a Chipco anything, you'll soon be using Chipco everything else.

Chipco Buctril® gives early control of broadleaf weeds in newly planted grasses for sod or seed production.

Chipco Turf Herbicide MCPP controls clover, chickweed, knotweed and other surface creeping weeds and is safe and effective for use on most bent grasses.

Chipco Turf Kleen is a broad spectrum herbicide that controls broadleaf and surface creeping weeds with a wide margin of safety around trees and shrubs.

Chipco Spot Kleen is a systemic fungicide for control of dollar spot, Fusarium blight, stripe smut, large brown patch and copper spot.

Chipco Thiram 75 prevents and controls snow mold, large brown patch and dollar spot. Used with Spot Kleen, it offers a complete disease control program.

Chipco Microgreen Liquid prevents chlorosis which results in long lasting deep green color, more root growth and less desiccation.

Chipco Turf Herbicide D is a general purpose broadleaf herbicide ideally suited where economical control is desired.

Chipco Spreader Activator is a quality adjuvant to increase the efficiency and effectiveness of turf chemicals.

Chipco Crab Kleen gives economical and selective post-emergence control of crab grass, chickweed and other grassy weeds in established turf.

Rhodia

Rhodia Inc., Agricultural Division, Monmouth Junction, New Jersey 08852

Industry News

Purdue receives NASA grant

Purdue University's Department of Horticulture has received a $28,476 National Aeronautics and Space Administration research grant to study plant reaction to mechanical stress.

Dr. Cary A. Mitchell, assistant professor of plant physiology at Purdue, will serve as principal investigator for the project.

The research is funded for a single year with possible renewal. Mitchell's earlier research which subjected plants to vibrational and contact stress drew world-wide interest, including that of NASA officials who expect plants may one day have a place in space flights.

The project seeks the answer to a number of specific questions regarding plant behavior under stress conditions.

Velsicol merges

Velsicol Chemical Corp. has announced a merger between Velsicol and Michigan Chemical Corp. effective Jan. 1, 1977. The newly formed corporation will be known as Velsicol Chemical Corp.

Freeport proceeds on uranium project

Freeport Minerals announced that it is proceeding with a $32 million project to recover uranium oxide as a by-product from phosphate rock processed into fertilizer material by Freeport in Louisiana.

The recovery facilities will be installed by Freeport Uranium Recovery Co., a wholly owned subsidiary of Freeport, at Freeport's phosphoric acid plant at Uncle Sam on the Mississippi River. The project is scheduled for physical completion and intitial start-up in the last half of 1978.

PBI/Gordon markets Exhalt 800 extender

Marketing of Exhalt 800 Sticker-Extender to the professional turf market was assumed by PBI/Gordon Corp., Kansas City, as of Dec. 15, 1976.

The announcement was made by Kay Fries Chemicals, Inc., Stony Pt. N.Y., the firm which developed the product and which previously handled its marketing.

Exhalt 800 is efficaceous in lengthening the effective time period of pesticides, or permitting the use of lower recommended dosages.

Root dip tested as Crown Gall control

A crown gall related bacterium, called isolate 84, has successfully been used as a root dip on several fruit crops to control Crown Gall. This material is now under test with Euonymus "Sarcoxie" and results of initial tests are favorable. This research is sponsored in part by the Ohio Nurserymen's Association.

U.C. gets $2100 for turfgrass study

Continued financial support by California Turfgrass Council of ongoing turfgrass research at the University of California's South Coast Field Station in Santa Ana, was confirmed in mid-November when the organization turned over its check for $2100 to the University to help fund further work.

The payment represented half the Council's commitment to the research program for the 1976-77 year with the other half scheduled for presentation early in 1977.

Accepting for the University was Dr. Victor B. Youngner, U.C. agronomist based at the Riverside campus. He directs the program that is testing new perennial ryegrasses and blends of other grasses to determine their adaptability to Southern California and other 'bermuda belt' conditions.

New pesticide firm formed in St. Louis

Kitten & Bear Chemicals, Inc. has been formed recently in St. Louis to manufacture, formulate and distribute pesticides for the nursery and greenhouse industry. The new firm is headed by Dick Miller, Jim Erlinger and Dottye Miller, who resigned from Crown Chemicals to start Kitten & Bear.

ALCA Crystal Ball report available

Most landscape contractors see unqualified operators as the landscape industry's most pressing current problem; government intervention as the big problem of the future; and they tend to attack their own problems by working harder — all this according to the Associated Landscape Contractors of America's (ALCA) newly-released Crystal Ball Committee Report.

The Report is an investigation of the landscape industry's present, past and future. It characterizes the landscape contractor and draws a profile of the industry as it exists today. To understand the present, the Committee frequently traced the industry's roots back several decades.

The cost of the Crystal Ball Committee Report to non-ALCA members is $7.00, and $3.00 for ALCA members. Write: ALCA, 1750 Old Meadow Road, McLean, Virginia 22101.

How to avoid paying for more than you need. Or getting less than you want.

A tractor that's too big for the job is an unnecessary waste of capital.

While one that's too small ends up wasting time and costing money.

The secret is selection. And that's why John Deere provides a range of tractors and options that lets you match the equipment to the task.

The John Deere 2040 Tractor is powered by a 40-hp diesel engine with an 8-speed constant mesh transmission and the hydraulic power to handle most any attachment.

Designed for golf-course maintenance and other similar large-acreage mowing jobs, the 2040 is probably more than you need for most residential lawn work.

So we offer the 10-hp 210 Tractor. Plus 12-, 14-, 16-, and 19.9-hp models to give you a choice and the exact power size you need.

Which means there's a John Deere Tractor just right for the job you have to do.

You also get fast parts availability, flexible financing, and the value of reliable quality that's been a tradition at John Deere for more than a century.

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In any size you need.

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People on the Move

Larry Bennett has joined **Chemonics Industries** in Phoenix as an entomologist for its pesticide evaluation division. Prior to joining Chemonics, Bennett was with the University of Arizona at its Mesa Experiment Farm. He will be performing contract research to determine the efficacy of agricultural products.

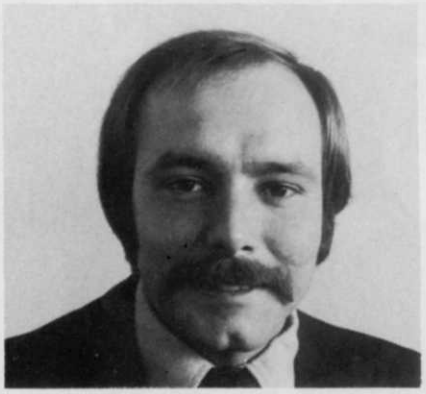
Thomas Rutledge has joined the agricultural division of **Ciba-Geigy Corp.** as field sales representative. In his new position, Rutledge will sell and promote and sell products for use in agricultural, industrial and home and garden markets. He received a B.S. in plant and soil science from Southern Illinois University at Carbondale.

David W. Johnson has been named national accounts sales manager for **Swift Agricultural Chemicals Corp.** a division of Estech, Inc.

Dave Herndon has joined **Thompson-Hayward Chemical Co.** as an agricultural sales representative. Herndon holds a B.S. in Agricultural Economics from the University of Florida at Gainesville. He is a member of the Florida Horticultural Society.

Arthur E. Schmidt has been appointed marketing manager of the sweeper division of **FMC Corp.,** of Pomona, Calif. A native of Milwaukee, Schmidt holds a B.S. in Civil Engineering from the University of Wisconsin.

Robert E. Risdale has joined the regulatory affairs department of **ICI United States Inc.** as an Environmental Protection Agency registration specialist. Dr. Risdale is a graduate of Rutgers University, where he received his bachelor's degree in general agriculture, as well as a master's degree and a doctoarate in entomology.



Joe Guarise

Dave Herndon

Steve Stone

Richard Ostrowski has been promoted to senior project manager, research/commercial development, at **Velsicol Chemical Corp.** Ostrowski received his B.S. in plant pathology from the University of California at Davis, and holds a Ph.D from Oregon State University at Corvallis.

Frank Depew, executive vice president, **Jacobsen Manufacturing Co.,** has announced a restructuring of the firm's organization, resulting in the establishment of a consumer products division, a turf products division and a parts division.

Victor M. Cushing has been appointed vice president and general manager of the consumer products division. **Howard L. McPherson** is appointed vice president and general manager of the turf products division. **John C. Krug** has been appointed vice president and general manager of the parts division.

E. M. Lentz has been elected president of the **Oklahoma Plant Food Educational Society.** A fertilizer salesman with Phillips Chemical Co., Lentz holds a B.A. in agricultural economics from Kansas State University.

Gerald E. Kimmell has been appointed national field sales manager of consumer products for the **Toro Company's outdoor power equipment group.** Born in Manitowoc, Wis., he holds a B.S. in economics from the University of Wisconsin.

Joe Guarise and **Steve Stone** have joined the **Harvest Publishing Co.,** publishers of WEEDS TREES & TURF, as advertising sales representatives. Guarises was formerly associate publisher of a Chicago-based consumer magazine and has worked for Crain Communications and IPC Business Press of Great Britain. Stone, who holds a B.A. in advertising and marketing from Farleigh Dickinson University, was most recently eastern district advertising manager for Pensions & Investments. Harvest Publishing Co. is a subsidiary of Harcourt Brace Jovanovich, second largest publishing company in the world.

For ad on following page circle 101 on free information card

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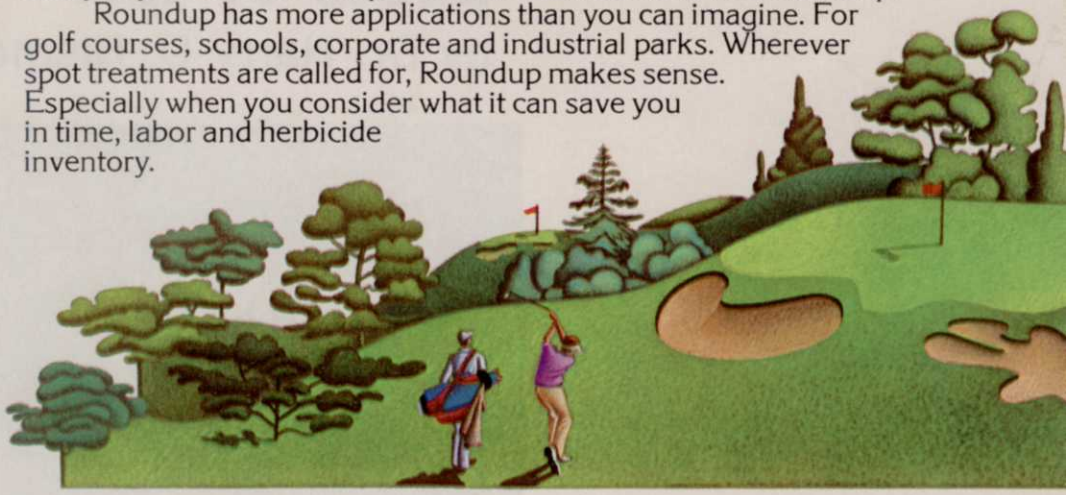
"Translocation" is the key.
Roundup is applied to the weed foliage, absorbed through the leaf surface, and "translocated" throughout the entire plant. In this way, Roundup effectively destroys most weeds—roots, rhizomes and all.

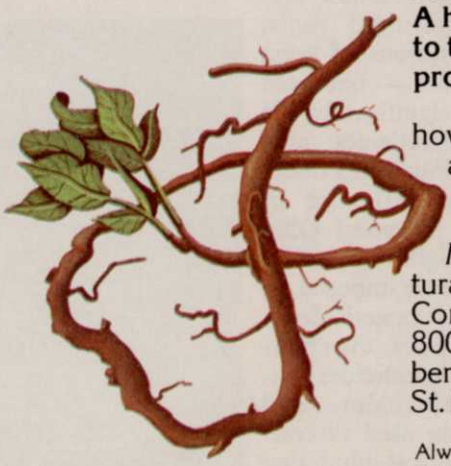
Roundup® herbicide by Monsanto is powerful enough to control many of the toughest annual and perennial weeds in one application.

Once, several different herbicides and frequent repeat treatments were needed. Now, one man with a backpack or tank sprayer can handle many of your weed cleanup chores in one treatment with Roundup.

Roundup has more applications than you can imagine. For golf courses, schools, corporate and industrial parks. Wherever spot treatments are called for, Roundup makes sense. Especially when you consider what it can save you in time, labor and herbicide inventory.



Roundup destroys most emerged annual and perennial grasses and weeds.
Including bluegrass, bermudagrass, quackgrass, bindweed, johnsongrass, fescues, and vaseygrass.



Roundup.
A herbicide that gets to the root of the problem.
To find out how to put Roundup at the root of your weed problems, write: Roundup, Monsanto Agricultural Products Company, C3NJ, 800 North Lindbergh Blvd., St. Louis, Mo. 63166.

Always read and carefully follow the Roundup label directions. RI 2/7

Roundup has no residual soil activity.
And you know what that can mean for your landscaping program. However, for seedling weed control, simply follow your Roundup treatment with an effective residual herbicide.

Monsanto

THATCH:

a barrier to control of soil inhabiting insect pests of turf

by Dr. Harry D. Niemczyk

Thatch is a major factor limiting the effectiveness of insecticides in controlling soil inhabiting insect pests of turf.

Timely irrigation is the key to obtaining the maximum control of grubs and other insects that feed on turf roots. Irrigate before spray dries.

Thatch—the tightly bound layer of living and dead roots, stems, leaves, and stolons of grass that forms under turf — has been found to decrease significantly the effectiveness of insecticides now used to control soil inhabiting insect pests of turf. The influence of thatch, discovered in recent Ohio studies, came to light only after federal restrictions were imposed on the use of traditional insecticides.

For the past 25 years, the chlorinated cyclodiene insecticides, aldrin, dieldrin, heptachlor, and chlordane, have been used successfully to control the soil-inhabiting insect pests of turf. Generally, a single application of one of these insecticides provided control for several years. However, actions taken by the Environmental Protection Agency (EPA) over the past few years have eliminated heptachlor, aldrin, and dieldrin for this purpose. Current hearings concerning chlordane indicate that it may meet the same fate.

If, in fact, this use of chlordane is cancelled, how can the turfgrass manager control soil-inhabiting insect pests of turf? The obvious answer is a shift to the organophosphate (O-p) insecticides which are

Insect pests such as Japanese beetle grubs, below, top, and bluegrass billbug larvae feed in and under thatch. Some inecticides are bound to the thatch before they reach the target.

currently labeled for this purpose, diazinon, chlorpyrifos (Dursban), and trichlorfon (Dylox or Proxol). This sounds easy. however, there is more to it than a mere shift to another material.

High water requirements

First, when the chlorinated cyclodiene insecticides were used, there was no great urgency to water the treatments in; eventually, they worked their way into the turf and soil. With the O-P and new carbamate insecticides there is a distinct urgency to move these materials to the target pest immediately.

These insecticides have characteristically short residual activity (a month or less). The most important medium through which the insecticide reaches the target pest is water; either irrigation or rainfall. This immediately presents a problem on golf courses and other turf areas without irrigation systems.

The thatch barrier

A second and major factor related to the effectiveness of the O-P insecticides currently registered is that *they do not move freely through thatch.* This layer, which is tightly intermingled between the layer of green vegetation and the soil surface, is common in golf course or home lawn turfgrass.

Many experiments on control of various species of grubs (Japanese beetle, northern masked chafer, billbug, *Ataenius*) conducted in Ohio from 1971 to 1976 have shown that when liquid or granular formulations of diazinon are applied to turf at 5.5 to 6 pounds AI/acre (active ingredient per acre), 90 percent or greater control is achieved. Appli-

cations of liquid chlorpyrifos (Dursban®) at 2 and 4 pounds AI/acre gave an average of 69 and 74 percent control, respectively. However, when these two insecticides, in either liquid or granular form, were applied at the same rates to turf with 0.5 inch or more thatch, the percent control achieved was sharply reduced. Granular diazinon at 5.5 to 6 pounds AI/acre gave 69 to 74 percent control and chlorpyrifos at 2 and 4 pounds AI/acre, 21 and 26 percent, respectively. Liquid formulations of diazinon at the same rate gave 52 to 60 percent control and chlorpyrifos 51 to 63 percent. The experiments and general field experience have shown that granular diazinon, in low concentration formulations, provides better control than the liquids.

The reason for this reduced effectiveness was investigated through laboratory experiments conducted at the Ohio Agricultural Research and Development Center, Wooster. The results confirmed that most of the insecticide was being adsorbed (bound) to thatch and thus, did not reach the target. Of the two insecticides, diazinon and chlorpyrifos, the latter was the most readily absorbed. Indications are that this is a physical-chemical binding which is not reduced by extensive aerification.

Though the tendency for trichlorfon (Proxol® or Dylox®) to be adsorbed is much less than that of diazinon and chlorpyrifos, its performance in controlling soil inhabiting pests has ranged from poor to excellent. The reasons for this variability are not known.

Our knowledge concerning the specifics of insecticide movement through this dense mat of organic matter called thatch is almost nonexistent. Much is known about the factors related to movement of insecticides through soil, but not through thatch. The intricacies and characteristics of insecticide movement through thatch must be better understood if we are to continue having controls in the future for pests that live under it.

Key: timely irrigation

While the performance of O-P insecticides is reduced by thatch, proper and timely use of water increases the probability of obtaining the most control possible from

Table 1. A summary of grub control tests in Ohio — 1971-6.

			Thatch		No Thatch	
Insecticide	Formulation	Rate lb AI/A	No. Tests	Avg. Percent Control	No. Tests	Avg. Percent Control
Diazinon	2G	5.5-6	(7)	74	(5)	93
"	5G	5.5-6	(4)	69		
"	50 WP	5.5-6	(2)	60		
"	4 EC	5.5-6	(11)	52	(2)	90
Chlorpyrifos (Dursban®)	0.5 G	2.0	(2)	21		
"	0.5 G	4.0	(3)	26		
"	2 EC	2.0	(4)	53	(3)	69
"	2 EC	4.0	(4)	63	(2)	74
"	4 EC	2.0	(4)	51		
"	4 EC	4.0	(2)	58		
Trichlorfon (Dylox-Proxol®)	80 SP	8.0	(4)	68	(1)	78

the treatment. This is reflected on the labels of liquid products currently registered for grub control in turf. Most labels recommend using 15-30 gallons of spray per 1,000 square feet. This volume may be impractical for the turf manager or operator of a lawn care firm, but it is required for optimum performance.

If less than the recommended volume of spray is applied, the treatment should be irrigated with ½-inch or more of water immediately after application. Sprays of these relatively short-lived insecticides should not be allowed to dry before irrigation is applied. A good time to make applications is when the turf is still wet. Some golf course superintendents have achieved fairly good control by applying the insecticide sprays during a rain.Granular formulations must also be watered in but the need is not as immediate as it is for the spray treatments.

New insecticides

In view of adsorption and problems of in-consistent control with some currently registered products, what does the future hold for control of soil inhabitating insect pests? Our best answer rests with the two experimental insecticides, one an O-P and the other a carbamate, which control grubs in spite of thatch. The former is a product of the CIBA-GEIGY Corporation and the latter of Fisons Corporation. Extensive field tests have shown both to be very effective against grubs under thatch. Laboratory tests indicate their effectiveness is due to the fact that they are not adsorbed onto thatch. These compounds are short residual insecticides and will also require the timely irrigation or rain very soon after application. Early projections indicate that one or both of these materials may be available for commercial use by the spring of 1978. □

Dr. Niemczyk is professor of turfgrass entomology at the Ohio Agricultural Research and Development Center, Wooster, Ohio.

Table 2. Binding characteristics of insecticides on turfgrass thatch.

Insecticide	Units (mg) thatch required to bind 50% of insecticide applied
Chlorpyrifos (Dursban®)	4
Diazinon	75
CGA-12223	300
Trichlorfon (Dylox® - Proxol®)	500+
Bendiocarb	640+

Table 3. Summary of tests with the new experimental insecticides for control of grubs under a turfgrass thatch - OHIO - 1973-76.

Insecticide	Formulation	Rate lb AI/A	No. Tests	Avg. Percent Control
CGA-12223	1 G	1.0	(4)	88
"	1 G	2.0	(3)	96
"	5 G	1.0	(3)	76
"	5 G	2.0	(2)	99
"	4 EC	1.0	(3)	81
"	4 EC	2.0	(1)	98
"	2 EC	1.0	(4)	56
"	2 EC	2.0	(3)	87
Bendiocarb	76 WP	1.0	(6)	78
"	76 WP	2.0	(4)	81
"	5 G	1.0	(2)	66
"	5 G	2.0	(3)	84

The largest tree in the world

Did you ever hear of a tree with 3,350 trunks? That's right—Just one tree with more than 3,000 trunks. It looks more like a forest than a tree.

It's the largest known tree in the world, but by no means the tallest. It grows in Ceylon, an island a little larger than West Virginia, about fifty-five miles from the southeast coast of India. According to the latest information available, this tree has 350 large trunks and 3,000 small ones.

It's a Banyan tree (Ficus bengalensis, L.) and is one of nature's wonders. The name BANYAN is derived from the word BANYAS, or Hindu traders, who found the natural shelter of the large branches an idea market place. So thick is the foliage that the sun does not penetrate the dense shade of some of these large trees.

The Banyan tree is a native species of India. The lower branches, growing out from the main trunk, are so long that they would sag to the ground if not propped up. The tree itself provides these props in the form of secondary trunks, which develop from aerial roots growing downward at irregular intervals along the underside of the branches. When these roots reach the ground, they take root and grow into the earth.

Although the largest Banyan trees may reach a height of only about one hundred feet, their growth horizontally is virtually unlimited under favorable conditions.

A Banyan tree may start from a seed-bearing fig, dropped into the top of a palm tree by a bird. When the seed inside the fig sprouts, it is at first nourished by the substance of the fig, as it grows downward. After reaching the ground and taking root, the nourishment provided by the soil causes the young tree to develop its main trunk and branches rapidly. As it grows, eventually the host tree is enveloped and being deprived of light, air and moisture, it withers away.

This Banyan tree at Edison Botanical Gardens, Fort Myers, Fla., has over 100 aerial roots with a 352-foot circumference.

The Banyan tree, which belongs to the Mulberry family MORACEAE, produces figs about one-half to three-quarters of an inch in diameter. They grow in pairs, and ripen between February and May, becoming red. They are not edible. An average tree may produce thousands of figs each year.

The leaves are large — sometimes reaching a length of eleven inches and a width of five or six inches. Medium to dark green, shiny on the front and dull on the back, they have large, light green veins about one-half to one inch apart. There are many smaller veins closer together. When a leaf is pulled or broken from a branch, a white, milky, sticky substance (latex) comes out.

The tree has no flowers that are visible. There are small flowers, however, inside the figs. The blossoms are of both sexes. Wasps gain entrance through holes in the tips of the figs and lay eggs inside. Pollination occurs when the "fig insects" which hatch and mature, leave one fig and enter another.

The wood of the main trunk and of other well-developed secondary trunks is of little or no value commercially. The strong aerial roots,

Continued on page 22

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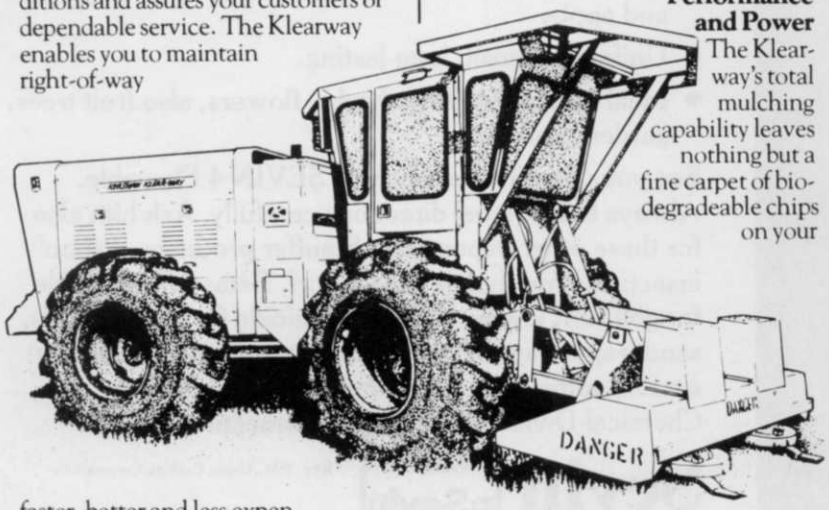

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largest tree

Continued from page 20

however, are sometimes used for cart yokes and tent poles. Aerial roots, before reaching the ground, have many strands at the lower end. These furnish coarse fibres for making rope. The latex is used in making rubber, and the twigs and leaves for fodder for elephants and cattle.

Banyan trees grow in at least sixteen tropical and semi-tropical countries around the world, within the limits of approximately thirty degrees north latitude and thirty degrees south latitude. In the United States they grow only in Florida and California (excepting perhaps rare speciments elsewhere) for ornamental purposes and shade. □

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Glade is one of the fastest germinating bluegrasses, quickly forming a thick rhizome and root system. A dense, low-growing, leafy turf, Glade has an attractive medium to dark green color.

Glade Kentucky bluegrass is your guarantee of physically pure and genetically true seed. You won't be seeding annual bluegrass (*Poa annua*), short-awned foxtail or bentgrass when you plant Glade. Specify this healthy little beauty in your next lawn seed mix. It blends beautifully with fine fescues and other elite bluegrasses, persists in shade when many others weaken. Glade Kentucky bluegrass is available at your local wholesale seed distributor. Insist on Glade in your mix.

Another fine, quality-controlled product of Jacklin Seed Company.

Glade

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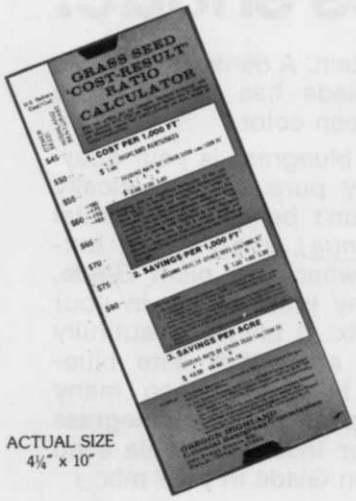

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Careful pruning can rejuvenate trees, shrubs

If woody ornamentals in your landscape need corrective pruning, the time is at hand, says a landscape horticulturist with the Texas Agricultural Extension Service.

"The key to pruning is to have a purpose in mind," emphasizes Everett Janne. "If you cannot justify the removal of a limb or branch, you better put up your equipment and go spade the garden for exercise."

Some reasons for pruning include removing dead or winter-killed growth or balancing the top with the root system when setting out new plants. Diseased or insect-injured wood as well as storm or accident-damaged limbs should be removed as soon as possible, notes the Texas A&M University System specialist.

"Older shrubs can be rejuvenated by removing the older branches at the base. Pruning can also help develop a desired shape or size as well as aid in producing better flowers and fruit," points out Janne.

However, he cautions agains severe pruning. It is better to prune lightly and more often to prevent sunscald to the sensitive inner branches.

And, never leave stubs that invite the entry of insects and disease. Paint all wounds or cuts over three-fourths of an inch in diameter with a wound dressing available at any nursery or garden center. In lieu of regular wound dressing, common orange shellac makes a good temporary dressing.

"Plants which bloom in early spring with the appearance of new leaves should be pruned after they flower," explains Janne, "while those that bloom later in the spring or summer should be pruned now while they are dormant."

To make pruning easier and for good, smooth cuts, always use sharp tools, adds the horticulturist.

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The fertilizer facts and fiction of blended versus granulated

by Roger A. Brown

For those who make a livelihood by maintaining fine turf, as well as the do-it-yourself homeowner who is particular about his picturesque lawn, high quality fertilizer is indispensible. This means the right nutrients must be present. It also means good storage, handling and spreading properties. Here is where the manufacturer's skill and integrity are paramount. As it is with most things, there is the right and wrong way to manufacture fertilizer.

Companies selling ammoniated or granulated turf fertilizers sometimes point an accusing finger at blended products and claim they are inferior. In many cases, this has been a fair accusation but with others it was a way to divert scrutiny of their own products.

Special turf blends

Generally, dry blended fertilizer is made specifically for bulk farm spreading and crop use. Farm fertilizers tend to be high in phosphorous and potash and low in nitrogen. Almost the opposite is required by turf. As a consequence, most blenders combine Ammonium Nitrate (33 1/3-0-0) or Urea (45-0-0) with Triple Super Phosphate (0-60-0), Diammonium Phosphate (18-46-0), Muriate of Potash (0-0-62), and limestone. Some of these raw materials are high in salt content and are immediately available.

Because of the large volume of fertilizers needed by farmers, cost is an important consideration. Blenders tend to buy the best deal in price and sometimes sacrifice uniformity in particle size. Fertilizers lacking particle uniformity would not be recommended for turf.

The quality and analysis accuracy of ammoniated or granulated fertilizer is almost entirely dependent upon the manufacturer's facilities and the plant superintendent. The best superintendents or ammoniating foremen are those having the experience and know-how of when and how much of each ingredient to add to get an acceptable granule. It is a skill learned over the years that not everyone can master.

If ammoniated products are not dried properly in production or are not able to "cure" (chemically react) in bulk storage they may harden after they are bagged, thus making application difficult and tedious.

It is very rarely true that each granule in an ammoniated product contains the same analysis as printed on the bag. The larger granules tend to be high in phosphate and the smaller are high in potash. Many times, the fines are 100 percent potash. Most farm grades are easy to ammoniate because they are high in phosphate content.

Phosphoric acid helps the granulation process and produces a harder granule. An easy analysis to ammoniate would be a 1-2-1 ratio, such as 5-10-5. The higher the nitrogen and potash and the lower the phosphate, the more difficult the ammoniation process.

High vs. low analysis

The home lawn analysis, 20-10-5, has been popular for a long time, not because it is a good ratio for grass, but because its high phosphate content makes it easier to granulate.

A 25-5-10 analysis would be a very difficult fertilizer to manufacture and in some plants it would be altogether impossible.

A high concentration analysis like 25-5-10 or 33-3-10 doesn't allow room in the formula for the chemical reaction needed to create the necessary granulation action. That is why a low analysis high phosphate product can be hard, free flowing, uniform and dust free.

On the other hand, a high analysis, low phosphate fertilizer might be inconsistent in particle size with a soft surface that cannot withstand transportation and wears down causing a dusty product.

Some companies will make a base grade and blend nitrogen with it to form a high nitrogen analysis with better spreadability. In this case, you have a blended product of nitrogen and base.

Key is uniformity

The key to a good blended product is uniformity in particle size. If the manufacturer buys raw materials with uniform screen size as a prime consideration, uses good judgment and housekeeping to eliminate dust, and screens the finished product, an excellent non-segregating free flowing fertilizer can be the result. A company that uses these practices had a better analysis test record in one state than its ammoniating competitors.

Certain unique forms of nitrogen such as I.B.D.U. and sulfur coated urea as well as chelated sources of iron and other trace elements cannot be ammoniated because the heat of the process destroys their slow release and available properties. These important nutrient sources have to be blended with a base product to be available in a complete fertilizer.

Careful planning of a blended

Continued on page 28

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fertilizer facts and fiction

Continued from page 26

product can produce a beautiful combination of uniform prills that will be dust free, hard surfaced, non-segregating and excellent for broadcast application.

Because of environmental controls and the high cost of building and maintaining a large ammoniation plant, fewer are in existence. Today there are only 200 ammoniating plants versus 5,000 blend plants in the USA.

In determining which type of fertilizer is best — the blend or the granulation, the following are the important points to use in making your judgment:

1. Who are you buying it from? Are they reputable? Do they stand behind what they sell?
2. Who is the manufacturer? Will they be here tomorrow? Are they capable of producing a consistent quality fertilizer?
3. Does the product meet your nutritional requirements? Does it have the desired ratio of nitrogen, phosphorous and potash? Does it include water insoluble nitrogen? Does it contain the secondary and micro or trace nutrients you need? Does it contain the type of nitrogen and potash you prefer?
4. Will it spread properly? If for golf greens, are the particles fine enough so that the mowers will not pick them up? If for large turf areas, are particles uniform and large enough for broadcasting?
5. Is it manufactured in such a way that it won't segregate and streak the turf? Is it uniform in particle size? Will the product flow easily through the spreader?

If all the above questions are answered with "yes" then compare the cost. If the product meets all of the above requirements to your satisfaction and the cost is competitive, then buy it whether it is a blend or granulated.

Make grass stand up for its roots! □

Roger A. Brown is currently sales manager for The Andersons lawn fertilizer section. With over 25 years of experience in the specialty and turf chemical industry, he was active in the research and development of aquatic weed control chemicals and pelleted calcium arsenate.

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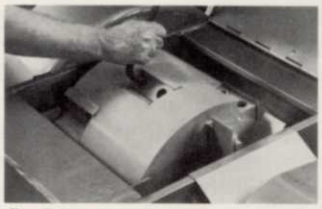

Double-edged knives staggered around the large 16-in. diameter solid steel rotor provide smooth, efficient cutting without an external flywheel. Easily accessible.

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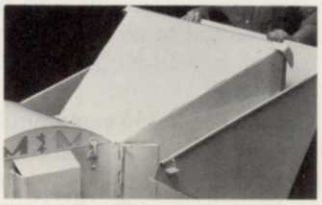

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Symposium explores urban forest vegetation

Most trees aren't cut out for city living.

The metropolitan environment is hostile to trees, and Nature has produced few species adapted to urban conditions, said Dr. George H. Moeller, Program Coordinator for the Pinchot Institute of Environmental Forestry Research, in the Foreword of a recently published Symposium Proceedings, "Better Trees for Metropolitan Landscapes."

The publication, 29 papers by 36 authors representing a variety of disciplines, is the result of a Symposium attended by more than 200 professional and technical people to provide up-todate information about tree selection, cultural practices, evaluation and testing techniques, and tree-breeding methods for trees to be used in urban environments.

The information will be useful to shade tree commissions and municipal arborists in helping decide which trees to plant under different site conditions. The Northeastern Forest Experiment Station of the Forest Service, U. S. Department of Agriculture, published the Symposium proceedings.

Urban forest vegetation is important to man's environment. Besides being esthetically pleasing, it provides recreational sites, protects and maintains water supplies, filters waste water, provides habitat and sanctuary for wildlife, enhances property values, abates noise, cleans the air, and improves the climate.

Problems arise from the fact that conditions found in metropolitan environments are unique and that most trees now being used in urban areas do not have the ability to withstand the hostile conditions existing there.

Unnatural environmental stresses such as clay fill, soil compaction, and reflected heat from buildings and concrete cause considerable damage and lead to and compound insect and disease problems.

The solution? According to Moeller, it is essential to develop trees that are biologically and functionally adapted to metropolitan environments as well as being esthetically pleasing.

Copies of this 256-page publication are available form the Government Printing Office, Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402. Ask for stock number 001-001-00421-9. The cost is $3.25 per copy.

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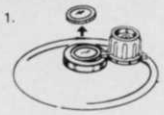

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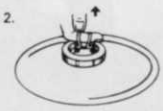

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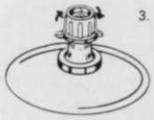

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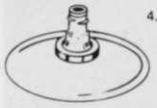

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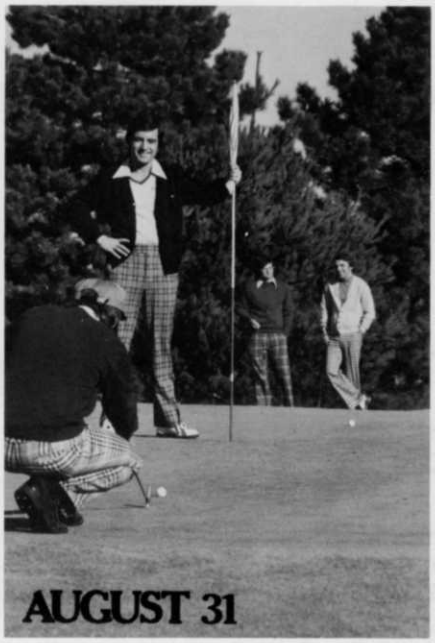

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The non-farm fertilizer market today

The specialty or non-farm fertilizer industry today comprises only about two and a half to three and a half percent of the total U.S. fertilizer industry and because of this it is a unique situation.

Unlike farm fertilizers, very little is exported. And, because of the limited volume sold, supplies for spring have already reached distributors so there is little chance of transportation problems affecting supply. Prices are relatively stable and should not chance for spring buying, except perhaps for a slight increase because of increased demand.

Demand is there

"Today the non-farm fertilizer supply situation looks very good," says Don Collins, vice president for communication for The Fertilizer Institute. "U.S. production of nitrogen and phosphate have increased to a point where we are adequately situated to produce what the U.S. market needs," he says. But he does warn the severe winter could increase curtailments of natural gas to ammonia plants which would affect the fall 1977 supply.

Although the short-range phosphate supply looks good, Collins says, the situation is continually dependent on environmental concerns as more emphasis is placed on regulations governing mining and surface mining, especially in Florida. This, he says, keeps expansion of phosphate mining on a very moderate level, but it should have little affect on supply until after 1980. "At this time," explains Collins, "it has been forecast that the world demand for phosphate will have increased to a point where there will be tight periods of supply."

The potash picture is quite different. Two-thirds of what we use in this country comes from the Canadian province of Sashkatchewan. Within the last year two of the approximately ten U.S. owned mines have been nationalized and the Premier has indicated he intends to have at least 50 percent of the province's mines controlled.

"He has said he intends to proceed on an orderly basis, but he hasn't really defined what that means," emphasizes Collins, and adds that the threat of nationalization has brought a great deal of uncertainty to the potash industry. "Until now it has been economically unfeasible to mine our own supplies of potash in the Dakotas and could change."

The non-farm fertilizer market has changed considerably in the past few years. "Fifteen years ago the principal formula was 10-10-10 or 5-1-5. Today we have gone to higher ratios of nitrogen and higher analysis, such as 18-14-10," Collins points out.

Bulk buying

There is also a trend toward bulk buying. "Turf managers are more sophisticated," Collins explains. "Now maybe he or someone on his staff may have an agronomy background and can determine this fertilizer needs. The turf manager then can have it custom bledned. Also there is considerable interest developing in micronutrients as the needs for higher plant quality increases."

An interesting fact about micronutrients is that if claimed by the manufacturer, they must be guaranteed on the label along with the micronutrient ratios. Each state regulates fertilizers. The Fertilizer Institute along with the American Institute of Plant Food Officials have written uniform farm and non-farm fertilizer laws and have been urging states to adopt laws as closely as possible to the ones recommended. Florida, says Collins, has deviated the most from the uniform bills. "This isn't necessarily wrong," he says. "It is trying to protect its own fertilizer industry. But it does make it difficult for interstate marketing."

Looking ahead, Collins sees the Clean Water Act of 1975 as perhaps having the most effect on the fertilizer industry.

Clean Water Act

"Section 208 of that act governs non-point sources of pollution such as agricultural run-offs and run-offs from municipal lasts. Under section 208 each state must formulate its own clean water regulations for non-point source pollution. "It is conceivable, he says, "that a state could set up its regulations in such a way that it could restrict or control the use of specialty fertilizers."

Basically fertilizer is far from a water polluter. Potash has little if any affect on water. Phosphate which attaches itself to the soil, only reaches water with soil run-off. Nitrogen must leach down to through the soil profile to ground water level to become a pollutant. But before these situations develop, the applicator has already seen the effects on his plants.

If manufacturers' recommendations are followed, and there is a wide margin for error, fertilizers are one of man's most beneficial substances. They promote green growth which cuts down on erosion and noise, and saves energy. And they make any physical environment far more pleasant. □

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Professional applications of pesticides and fertilizers . . . a $440 million market

Pesticides and fertilizers for professional applications are a big business in the United States on their own, and need not take a back seat to the farm and consumer markets for these products. In 1976, about $440 million will be spent at formulator's level by 16 market segments including golf courses, landscapers, schools and colleges, and others for products to fertilize lawns, kill weeds, control insects and perform similar functions.

The products

The products, about twelve in all, fall into three broad functional categories. Pesticides are the most important group with consumption of $250 million in 1976 followed by fertilizers with $165 million, as shown in Figure 1. All values are in formulator's dollars.

Herbicides are the leading pesticide with $105 million. They are used by the most end users in significant quantities as shown in Table 2. Insecticides are a close second, at $90 million. The two pesticides together account for nearly 80 percent of all pesticide sales.

Table 1
U.S. PROFESSIONAL MARKET FOR PESTICIDES AND FERTILIZERS 1976

Product	$ Million	% Of total
PESTICIDES		
Herbicides	$105	24%
Insecticides	100	22
Other-a	45	10
Total	250	56
FERTILIZERS	165	38
SOIL CONDITIONERS	25	6
TOTAL	$440	100%

Includes fungicides, aquatic pesticides, nematicides, rodenticides and growth regulators.

The markets

Golf courses, and landscaping and lawn service companies share the lead in total purchases. Horticultural firms (flowers, shrubs, and turf), structural pest-control operators, highways, forestry, government agencies, electric utilities, schools and colleges, and railroads are the other important market segments. Minor end uses include industrial weed control, mosquito abatement, cemeteries, airports, and asphalt pavers.

Golf courses use all products except rodenticides, mainly to maintain their fairways, tees and greens. The actual consumption of the various products varies by the geographic location, size of the course and ownership. For instance, courses in the south tend to use more fertilizers, insecticides and nematicides than those in the north. On the whole, private courses are better maintained than municipal courses and spend proportionally more for pesticides and fertilizers.

Landscapers concentrate on planting and maintaining shrubs and other ornamentals while lawn-service companies chiefly fertilize lawns and apply herbicides and insecticides as needed.

The horticultural segment includes firms which grow cut and potted flowers, ornamental trees and shrubs, and sod. Although consumption is heavy in fertilizers, this end use also consumes every product type except aquatic pesticides and rodenticides.

Since structural PCO's concentrate on exterminating insects in and around buildings, their major product is insecticides. However, they are also important consumers of rodenticides. In addition some PCO's also control insect and plant pests on ornamentals and turf and buy herbi-

cides, insecticides and fungicides for these uses.

Highway and road departments, especially at the state and county level use herbicides to kill all vegetation along guard rails and similar areas and to control brush along roadways. Political considerations, in which people are employed to mow grass and otherwise maintain surroundings, hurts the use of herbicides to improve turf areas.

Electric utilities use selective herbicides to control brush under transmission lines, and take soil sterilants and contact herbicides to control vegetation at substation. Fertilizers are used chiefly to promote rapid growth along transmission lines after construction or erosion.

Railroads also buy herbicides to kill all vegetation in the road bed and to control the brush along the edges. Among forestry companies the use of fertilizers for mature stands is a controversial subject. Some large companies are heavy users, others use none. Herbicides find application in clearing an area for fresh seedings and in stand release, the killing of unwanted species to promote the growth of desirable trees.

Contract applicators

Contractors are important in applying herbicides for electric utilities, railroads, and forestry companies. Most applicators specialize in one of these industries and do little work outside their specialty. In forestry they are most active in insecticides. Interestingly, the choice of product varies more by industry than by individual company. In some industries the company that hires the contract sprayer tightly controls the products used, in others the choice is entirely with the contract sprayer. Application from the air, either by helicopter or airplane, is important in electric utilities, forestry, and for some forms of mosquito control.

Suppliers

Literally hundreds of suppliers formulate products for this industry. Pesticides move through as many as five tiers from toxicant manufacturer to end user, as shown in Figure 2. In some cases a manu-

Continued on page 37

Figure 1

CONSUMPTION BY PRODUCTS IN THE PROFESSIONAL MARKETS FOR PESTICIDES AND FERTILIZERS 1976

TOTAL $440 MILLION

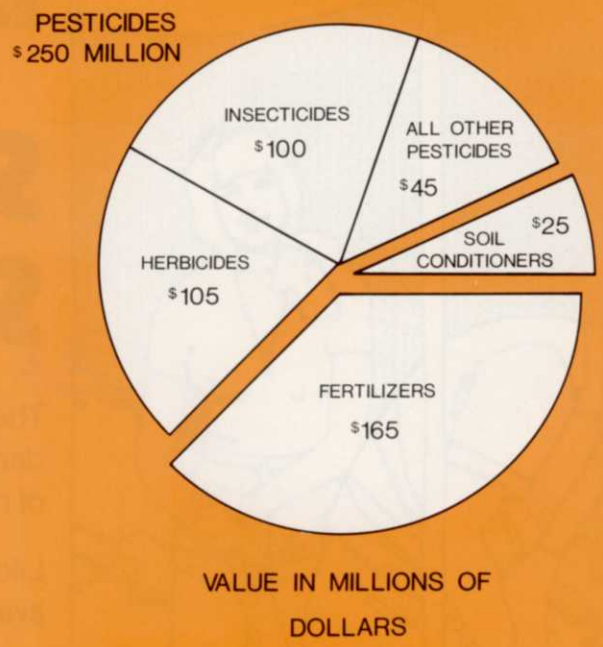
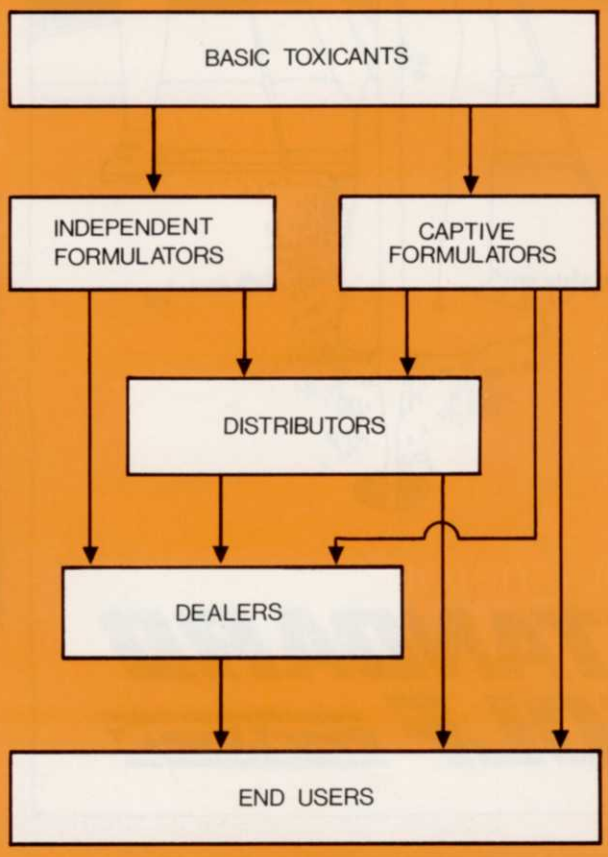


Figure 2

TYPICAL DISTRIBUTION PATTERNS FOR PESTICIDES FOR PROFESSIONAL USE



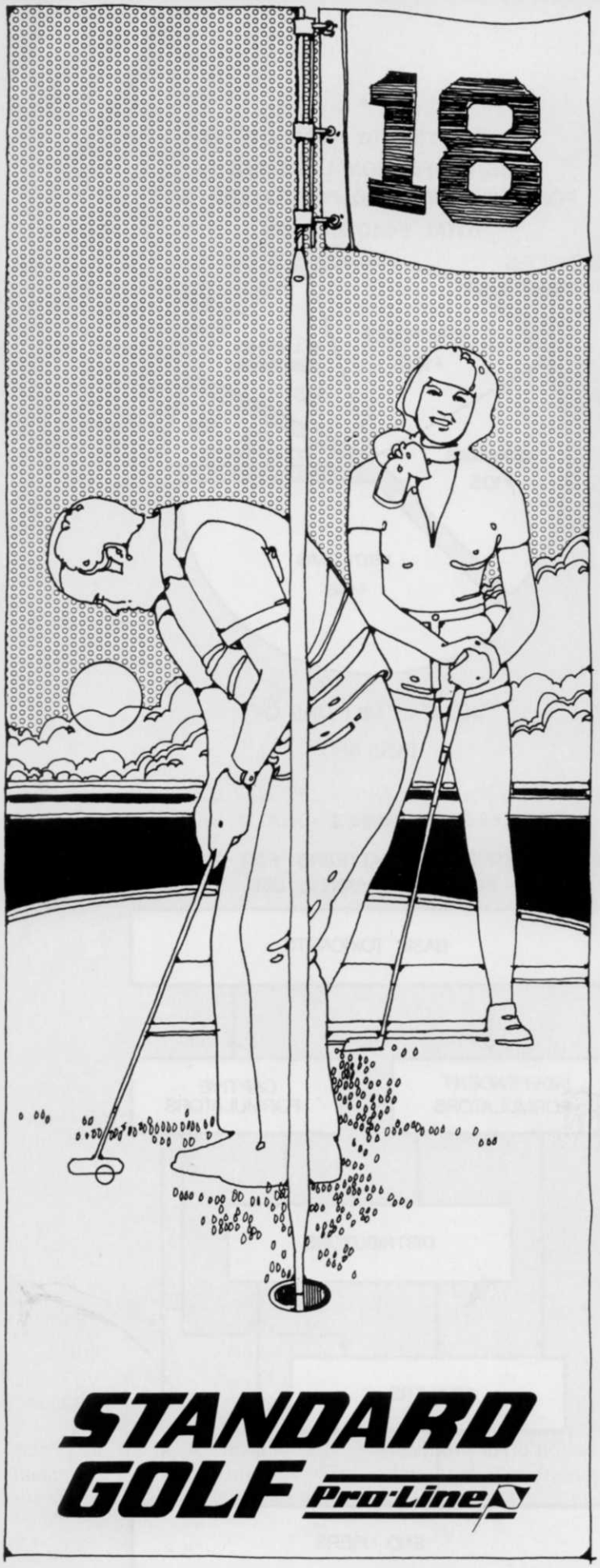


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Table 2
PRODUCTS AND MARKET SEGMENTS FOR PESTICIDES, FERTILIZERS, AND SOIL CONDITIONERS FOR THE PROFESSIONAL MARKET

Market segment	Herbicides	Fertilizers	Insecticides	Fungicides	Soil conditioners	Growth regulators	Aquatic pesticides	Nematicides	Rodenticides
Airports	X	X	X	—	—	—	—	—	—
Aquatic pest control	—	—	—	—	—	—	X	—	—
Asphalt paving	X	—	—	—	—	—	—	—	—
Cemeteries	X	X	X	—	—	—	—	—	—
Electric utilities	X	X	—	—	—	—	—	—	—
Forestry	X	X	X	—	—	—	—	—	—
Golf courses	X	X	X	X	X	X	X	X	—
Government agencies	X	X	X	X	X	X	X	X	X
Highways	X	X	X	—	—	X	—	—	—
Horticulture	X	X	X	X	X	X	—	X	—
Industrial weed control	X	—	—	—	—	—	—	—	—
Landscaping and lawn service	X	X	X	X	X	—	—	—	—
Mosquito abatement	—	—	X	—	—	—	—	—	—
Railroads	X	—	—	—	—	—	—	—	—
Schools and colleges	X	X	X	—	X	—	—	—	—
Structural PCO's	X	X	X	X	—	—	—	—	X

applications

Continued from page 35

facturer of the toxicant also formulates and sells direct to a large user, for example, a major contract sprayer for railroads. By contrast, when a PCO buys a small quantity of herbicides from a dealer, products move through all tiers.

The top 19 suppliers listed in Table 3 hold 52 percent of sales of pesticides and fertilizers for professional uses. An additional 94 firms supplied 32 percent, together these 113 companies hold 84 percent of the business.

Table 3
THE MAJOR SUPPLIERS OF PESTICIDES AND FERTILIZERS TO PROFESSIONAL MARKETS

Company	Chief products
Amchem	Herbicides
Chevron	Insecticides
Ciba-Geigy	Herbicides
Diamond Shamrock	Herbicides
Dow	Herbicides
Du Pont	Herbicides
Elanco	Herbicides
Kerr-McGee	Fertilizer
Lebanon Chemical	Fertilizer
National Chemsearch	Fertilizer
Occidental	Fertilizer
Premier Brands	Peat moss
Rollins	Insecticides
O. M. Scott	Fertilizer
Southern Mill Creek	Insecticides
Swift	Fertilizer
Thompson-Hayward	Herbicides
U.S.S. Agri-Chemicals	Fertilizer
Velsicol	Herbicides

The future

Although overall consumption will grow at a steady rate of about 3.5 percent annually to $500 million in 1980, as measured in constant dollars several segments will increase at rates far above the average. Consumption by forestry, asphalt paving, structural pest-control operators, and mosquito-abatement groups will all grow at a good rate.

The opportunities

This business represents important opportunities for alert suppliers. For example, government legislation will force the replacement of chlordane for many applications and new products will be required. Furthermore, government and environmental pressures are also being placed on other products including organophosphates, and replacements must be found. Other opportunities center around (1) improved products including effective growth regulators, and (2) new, relatively untapped markets including asphalt paving, forest fertilization, and lawn service.

Details are available in a new 532-page survey, *The Professional Markets for Pesticides and Fertilizers,* available on subscription only from C. H. Kline & Co., Fairfield, N.J. □

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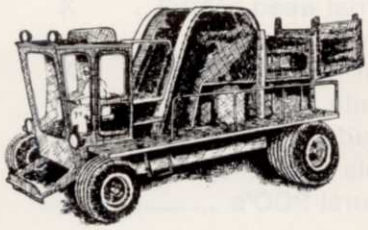

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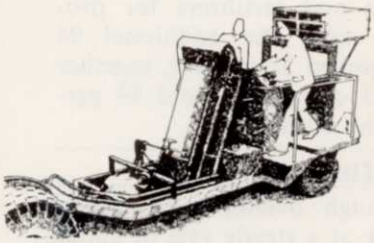

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New fire ant controls needed now

The imported fire ant continues to spread in Texas. In the last year it has been found in 11 new counties for a total of 93 counties.

The control for the imported fire ant has been a bait which contains the poison Mirex. Its secret of success has been its slow effect. Worker ants that go out in search of food find the Mirex in the corn cob grit and oil bait. Workers, before they died, had time to remove the oil (which contains the Mirex poison), return to the mound and feed the poison to the queen and other ants in the colony.

Other insecticides are fast acting compounds that kill the food gathering worker ant before it can return to the mound and feed the other ants. The result is that most of the ants in the mound escape the effect of the compound.

How Mirex works

Mirex is a chlorinated hydrocarbon, like DDT, and is a very persistent chemical. In fact, Mirex is the most persistent of the chlorinated hydrocarbon insecticides. Because of its persistence, it slowly builds up in the environment with use.

It is stored in the fat tissue of animals. When an animal like a frog eats an ant with Mirex, the frog has a little Mirex stored in its fat; when the frog eats another ant with Mirex, a little more Mirex is stored in the frog fat. Slowly, the Mirex builds up in the frog until a toxic amount is reached.

Mirex is a slow killing compound. While it is not toxic unless present in large amounts in man, the slow buildup in the tissues of animals in the food chain leading to man present a potential hazard. It is this slow accumulation, along with the more direct effects on wildlife, that has led to the restriction in the use of Mirex and the present elimination of the use of Mirex in the area-wide program supported by the Texas Department of Agriculture.

A search for alternatives has resulted in consideration of thousands of chemicals. None have been found that are effective in the bait as a replacement for Mirex, because they are either not active against the fire ant or they are too toxic and kill the ants before they get back to the mound. Killing the worker doesn't solve the problem as the queen continues to produce replacements.

Entomologists with the Texas Agricultural Experiment Station (TAES) have begun a search for an alternative to Mirex. One group of compounds being considered are the "juvenile hormones." They are not usually toxic to adults but prevent the development of the young into adults.

Bradleigh Vinson, TAES entomologist, explains that the juvenile hormones kill young fire ant larvae and prevent reproduction (egg laying by the queen). These compounds look promising because they have no effect on the adult ant; therefore, the adult could eat the poison and carry it back to the mound and feed the queen and larvae. Theoretically, the compound would prevent replacement of the ants, and the colony would die.

Problems exist

This worked in the laboratory, but in the field the results were disappointing. Some mounds were killed, but others were not.

Why? Experiment Station researchers set out to answer these questions instead of abandoning a potentially promising control agent.

Research has shown that adult ants that eat the juvenile hormone destroy most of it in their stomach before feeding it to the larvae or queen, so that too little is left to do the job. Even less is fed to the larvae or queen if the colony is well fed.

The next question is, can this problem be overcome? Vinson is convinced that it can be.

Research shows that ants, like many other insects, communicate by chemical smell. These compounds, called pheromones (a type of chemical language), influence the behavior of the ants. The TAES researchers have identified one of these compounds, called a brood pheromone. When this compound is added to a small granule or pellet, the workers are fooled into treating the object as one of its larvae, and they carry it into the mound.

When the pheromone and the hormone are added to a carrier, the carrier (grit) is carried into the mound by the workers and is placed with the larvae, in the mound. The hormone contaminates the larvae, the target, resulting in their death. The result is a new concept in a bait approach to control of the imported fire ant.

More work ahead

While juvenile hormones still hold promise, much more work will be necessary before it is determined that they are safe and effective and before they are available at a reasonable cost.

Researchers have also found that some insecticides can be made less toxic on contact and can also be carried into the mound with the brood pheromone and certain foods. Vinson suggests the more toxic insecticides may offer promise if new, less toxic formulations and bait approaches can be developed. He says that an alternative to Mirex can be developed but that there is much to be done before an effective replacement is available.

TAES entomologists are also working to find an insecticide that can be used by the home owner for the fire ant problem in his yard. The encapsulated and biodegradable insecticides show promise for this limited use. □

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Rhodia announces reduction in price of its new herbicide

Rhodia, Inc. reports that Asulox®, a new herbicide for noncrop applications, may now be purchased at a suggested retail price of 15-20% less than when introduced last year.

The price reduction, which became effective January 1st, stems from improvements in the manufacturing process and increased use of Asulox, according to a spokesman for the Company's Agricultural Division.

A postemergent herbicide, the compound provides effective control of Johnsongrass and other grassy weeds.

Included in noncrop applications are highway and roadside rights-of-way, industrial plant sites, storage areas, lumberyards, warehouse lots, boundary fences and railroad rights-of-way and yards.

Rhodia says it has also applied for registration of Asulox for reforestation plantings and ditchbanks.

Recommended usage for control of Johnsongrass and other grassy weeds is 1 to 2 gallons per acre.

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Using plant protectants economically

by George M. Kozelnicky

Plant protectants are generally divided into herbicides, fungicides and insecticides. The EPA includes in its definition of pesticides other compounds such as certain surfactants and growth regulators, and such things as rodent-, pisc-, mollusc-, "icides", etc. For the purposes of our discussion here we will consider all of these as a group.

How can we economize in this area? We actually need to know how much pesticide costs are now before we can show a need for economy.

Two sets of data obtained last year are available. The firm, Harris, Kerr, Forster, sampling 100 clubs found that the annual maintenance cost per hole is $7244, + $467 over two years ago. This is $130,382 for an entire 18-hole course. The G.C.S.A.A. survey, based on a better sampling of 1168 clubs states the cost per hole to be $5632, + $748 over three years ago.

Regulations increase costs

The average annual cost of 'pesticides' for an 18-hole course is $4298 ($239 per hole). This is four percent of the entire annual budget (109,501) and may appear to be an insignificant area in which to attempt to economize. However, the costs associated with this area are subject to the same criteria and influences as all others, but unlike others, are directly affected by outside agencies such as the EPA which impose regulations.

Regulations and laws always seem to increase costs. Because of this you can count on the cost of product to rise, some products may well be unavailable in the future, and you will be told implicitly how you *must* use a product.

Before we use a plant protectant we need to have a reason for its use; i.e., we anticipate, or have, a problem. The first thing is to be aware of what the problem could be, or is. This requires foreknowledge on our part of many things. The more we educate ourselves about weeds, insects, diseases and other pests, the less expensive our operations will be and we *will* cut costs. If anything, our expertise will reduce the number of mistakes we are liable to make.

Weather records are useful tools

Knowledge of the life cycle of a pest is of value to us in knowing when it is vulnerable so that we can inflict damage upon it. Except in the case of certain fungi it does no good to apply a chemical to a pest which is not there. And since pest appearance is strongly influenced by environmental conditions, one must be aware of these also.

Keeping daily weather records is not a useless thing; over a period of years these can be a useful tool and reliable guide in planning your budget for expenditures of chemicals.

A good example of use of weather knowledge (especially where irrigation is not available) is the timing of the application of preemergence herbicides to take advantage of rains. A ½-inch rain is required for maximum effectiveness. If you miss a rain after having applied the chemical, you may well lose its effect. It costs money if you have to re-apply or you don't get control.

Another aspect: when the label says the chemical should not be applied when temperatures are too warm, do you go ahead and apply regardless of the stated temperature just because the job is set up? Convenience can result in loss of something and that something is usually measured in dollars and cents.

Knowledge of what a certain chemical can do is essential to your doing a job most economically. You need to know whether the action is one of strict contact or if action is by assimilation and subsequent spread through the host plant. Is it the right chemical for the job? Does a certain chemical have selective properties or does it affect a broad group of pests? Does the chemical have long residual life or is it one that is rapidly dissipated? Is the chemical capable of being rendered ineffective by some environmental factor?

Safety is important. Are your people, your applicators, capable of applying toxic chemicals without injury to themselves or to the environment? More importantly, do you provide them with the necessary protection and with supervision? Loss of service by an employee is costly!

Careful buying saves dollars

Armed with this foreknowledge and with all proper turf management procedures in gear, you are now ready to introduce into your program the chemicals, plant protectants, you need. A few pointers in this area are appropriate.

Don't buy more than you need; and certainly don't buy a drum when a 5-gallon pail will do. Don't buy substitutes! Read, understand and abide by the label.

Acquaint yourself with the common names of the chemicals you will be using. Brand, or trade, names differ; common names do not. For example, the Koban you use for Pythium control is commonly, Terrazole; its other names are MF-344, Truban, and OM2424, but its only chemical name is 5-ethoxy-3-trichloromethyl-1,1,4-thiadiazole.

Watch out for trade names

Continued on page 44

Let's talk about bad service.

Let's say you've gone to all the trouble of carefully selecting the turf care equipment you've been looking for.

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Only to start using it and then discover you can't get good service on it. It's like you went to all that trouble for nothing.

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Using plant protectants

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which may cover a number of different products, an example of which is Weedone. A can of Weedone may be PCP, 2,4,5-T, or a mixture of 2,4-D and 2,4,5-T,. The common name *Chlorothalonil* stands for the brands Daconil 2787 and Bravo (Forturf-1968). As a chemical it is known as *tetrachloroisoph-thalonitrile.*

The label also tells you how you must apply the product. It possesses all of the information about the product that you need to know and must meet every requirement imposed by the EPA. Then you may begin to prepare to apply it.

Check equipment calibration

Your application equipment must be in proper operating condition. This is the area in which economy begins. A worn-out pump causes loss of fuel, reduced pressure, and erratic spray pattern. Repair, where needed, pump and pressure regulator, leaking tanks and hose, replace innaccurate pressure gauges, improperly functioning agitators, and most importantly, nozzles.

Nozzles are available in brass, stainless steel, plastic, aluminum and tungsten-carbide metals. Your most economical compromise is the brass nozzle, followed by the stainless steel.

When your equipment is in good working order, you then need to calibrate it. Improperly calibrated equipment will also cost you money. Calibration procedures are readily available; such information even comes on the equipment itself.

There is nothing hard about calibrating a piece of equipment but you should be able to measure land.

The only true way is to determine the width of your nozzle coverage and then move a predetermined, measured distance. This gives you the squared area. In moving that distance, you have hung receptacles under each nozzle and collected the amount sprayed over that area. From this you can determine whether you are spraying too little, the required amount, or too much material.

Here is the place where you can determine if your nozzles are delivering uniformly. If there is a wide descrepancy in the amounts each delivers you may need to replace them all.

It saves money if you know the actual area you have to spray on your golf course. Guessing at an area will result in improper amount of product applied. There is the tendency to let the tank run out at this place or save what's left in the tank for the next place. Planning your route from area to area is an economical move.

Certainly, in order to get uniform coverage of all areas, predetermined speed set at time of calibration must be observed while applying on the golf course. Make an accurate measurement of your greens and other areas to which you will be applying chemicals.

Mix chemicals outside tank

Of seemingly insignificant importance but nevertheless of economic impact is the need to mix chemicals outside the tank. There is the opportunity for too much spillage when chemicals are loaded directly into the tank. And too, it's safer. Mix them outside the tank and then pour the mixture through the strainer into the partially-filled tank which should be in agitation.

Another important aspect is compatibility of chemicals. If you wish to mix two products together in order to apply once instead of twice, be sure the two chemicals are compatible. That is, be sure they are first miscible without settling out or coagulating and then not capable of being phytotoxic in the combination to grass.

When in doubt never mix

The wall of your chemical storage room, or that of your office, should have a compatibility chart. Don't mix if in doubt and certainly not if the chart shows incompatibility. Here again, convenience can result in wasted economy.

When the subject of prevention arises, it is possible to arouse many different opinions. The use of chemicals for prevention of a pest is common. The best example in our field is the use of pre-emergence herbicides for the control of the annuals Poa annua and crabgrass. Successes with goosegrass, however, have been far from satisfactory. The application of a pre-emerge appears to be more economical than relying on strict post-emergence control.

Of help here is the fact that the pre-emerge chemicals can be applied in the slacker times of golf play but most importantly, one application of pre-emerge beats 2, 3 or 4 of post-emerge.

As far as insect control is concerned, the erratic nature of the insect precludes our using insecticides for prevention. It is important that the insect be identified correctly and the chemical chosen be one that will do the most effective job the first time. Haphazard choices cost money.

Use proven disease controls

In the realm of prevention of diseases, one can apply the method to those which historically and potentially are capable of being very destructive. Such diseases are those

Continued on page 46

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Using plant protectants

Continued from page 44

which affect the root and crown of the grass plant and examples of which are the Pythiums, Helminthosporiums, snow molds, Fusarium blight and spring dead spot of bermudagrass. Most turf pathogens are found inhabiting the soil most of the time during their life cycle. In fact, it is from thence that the step to pathogenecity takes place.

Predict disease occurrences

The time of the occurrence and appearance of such diseases can be predicted with considerable accuracy. Therefore, the plan of attack is to reduce the potential of primary source of infection with a relatively inexpensive chemical so that when conditions become favorable for the full expression of disease, that expression will be easily met using a specific fungicide.

Specific fungicides usually have a higher price tag than broad spectrum chemicals. The important thing is that now one doesn't need to use as much specific fungicide. In contrast, should one wait for something like Pythium to appear, it's too late and no amount of specific fungicide is going to prevent loss of grass. The present method of control of snow molds is a good example of prevention. Snow mold chemicals are applied before snowfall. In this particular area, a good deal of economy can result.

Of course, how much economy can result from the foregoing suggestions is conditioned by each of your individual cases. As an example, fungicidal application to bermudagrass greens is less demanding than to bentgrass greens. Nevertheless, I hope that there are enough ideas here to stimulate your mind into delving into those areas where you can actually economize and find other areas in your operations where you can find other opportunities to economize. □

George Kozelnicky is with the department of plant pathology and plant genetics of the University of Georgia.

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Balan's new granular form makes it even easier to apply.

Hemlock scale attacks trees

A relatively unknown insect is killing numerous hemlock trees in southwestern Connecticut.

Mark McClure, an entomologist at The Connecticut Agricultural Experiment Station in New Haven, says that hemlock scale is a severe problem in parts of Fairfield County, especially in Westport and New Canaan. The scale also occurs in scattered pockets in New Haven County, but is less of a problem than in Fairfield County.

The scale, which looks more like a fish scale than an insect during most of its lifetime, attacks the underside of needles and feeds on sap. It prefers new needles, and primarily attacks the bottom branches. It may kill a tree in a few years. It was discovered in Queens, N.Y. in 1908.

McClure has approached the problem from two directions: one is chemical, the other is biological. He has tried several insecticides and has studied their effects, and is studying natural enemies of the scale in hopes of finding a way to control it without chemicals.

In his tests of chemical controls, McClure has found that Cygon 2E foliar systemic insecticide gives over 99 percent control when used during the peak of hemlock scale crawler activity in mid-June to mid-July. Except in the crawler stage the insect is generally protected from insecticides by a scale-like excretion.

While control can be achieved, McClure notes that if applied incompletely or at the wrong time insecticides can actually help the scale flourish by killing off most of its natural enemies.

In his biological control efforts, McClure is collecting foliage from infested trees to study parasites and predators of the scale. The foliage is placed inside cardboard cylinders, and he identifies and studies natural enemies that emerge.

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The ROSS Super Tree Stakes, with their pre-measured once-a-year formulation work on trees, evergreens, shrubs and bushes. Our high food value formulation 16-10-9 plus Iron and Zinc, helps promote fast, healthy growth.

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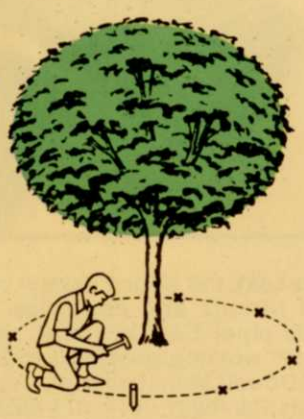

Be sure to ask for *ROSS* Super Tree Stakes. Available at your regular Ross distributor or write:

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◀ For ad on preceding page circle 121 on free information card

Versatile new Hypro sprayer pump

Hypro series 6500 pump has a wide range of uses. It will deliver up to 20 gpm (at 1200 rpm) or develop pressures to 300 psi, and it is available in either cast iron or Ni-resist. Its 5/8" shaft is stainless steel. Rolling vanes and cartridge type seals are available in a choice of materials.

The pump is designed for weed and insect control chemicals but is also used for many industrial solvents. A coupler is available for direct mounting on a truck or tractor PTO shaft, or—with optional mounting base—it can be driven by motor or gas engine.

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Toro products school hosts MSU students

Twenty-one men and one woman, all students at Michigan State University in East Lansing, Mich., participated recently in a four-day training seminar in servicing turf equipment, sponsored by The Toro Co.

The course is one of five offered by Toro's Turf Products Service Training Center to such customers as golf course maintenance crews, distributors' service personnel and students studying turf management. According to James R. Maloney, director of Toro's turf products service, the courses are designed to increase the professionalism of service personnel, especially in the maintenance and care of turf equipment.

The MSU students, under the direction of Dr. Kenyon T. Payne, are studying turf management in either the two- or four-year program at the University. The training they received at Toro's Eden Prairie, Minn., facility supplements their classroom training, Maloney said. "For some of them, it was their first look at the insides of the turf equipment they will be required to maintain once they enter the job market," he commented.

Subjects covered at the seminar were: fundamentals of reel and rotary mowers, hydraulics, obtaining maximum equipment performance using proper maintenance techniques, electrical circuit layout, and trouble-shooting and adjustment procedures for turf equipment.

Directors of the four-day seminar were Dale Atkinson, Toro manager of technical training for the turf service center, and Dean Gayther, field service technician.

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But the Greensaver also makes the aerating operation faster by automatically picking up the soil cores. As the tines enter the ground, the cores are forced through the tines into the drum. When it's full, just open the large door to empty it. Or you can leave the sides of the drum open, to deposit the cores on the green.

And the Greensaver features a special turf guard and roller which smooth the turf and prevent the sod from rolling up on the drum.

The new Greensaver is just one more way to put your 18-hp Turf Truckster to work. With other accessories, your Cushman can spray, spike, dump, and top-dress. Use it. It's more than basic transportation. It's a total turf-care system.

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Course updates landscaping theories

Just drive down the street of any town and you can see a variety of trees and plants in homeowners' landscapes, says Fred Buscher, Ohio extension agent, horticulture. Although many of the plantings are pretty and traditional, most make up unusable landscapes that have been outdated for 70 years!

This situation, which is commonplace in urban areas, has prompted Buscher to set up a series of landscape design short courses for residential properties.

A second advanced course in the series was held in December at the Ohio Agricultural Research and Development Center. Landscape contractors and nurserymen from around the state took advantage of the course to sharpen their skills for solving landscape problems using plants, pavements, and structures.

Buscher says that Ohio ranks only third behind California and Florida in sales of nursery products, but little has been done to develop the nurseryman's skills in designing home landscapes that are functional as well as aesthetically pleasing.

Buscher and Ohio State University landscape architects Jot D. Carpenter, James Hiss, and Norman Booth asked the participants to think out landscapes in a problem solving approach. Just as rooms are carefully planned before construction of a house, Buscher says use of space outside the house should be planned equally well. Plants and trees should be placed with the overall property in mind — not just the front door of the house.

Old-style foundation plantings are still used in many home landscapes, although they are no longer necessary.

The short course participants were encouraged to use plants in their landscape designs only for definite purposes. Climate control, windbreaks, privacy, and cutting the glare from traffic lights are legitimate reasons for placing plants in particular places. Aesthetics, although just as important, should be considered only after some of these landscape problems have been dealt with.

This second landscape short course was for persons who had participated in Course 1 of the series last January or had previous experience.

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From the Campus

Liquid fuels can be made from agricultural wastes

Producing gasoline or diesel substitutes from wood residues and other agricultural wastes is being researched by Texas scientists as a possible energy resource. It has the potential to convert wasted or poorly utilized resources into valuable fuels to help relieve our energy situation.

The seriousness of our energy shortages has in part been masked by our agricultural exports. Since 1970, total agricultural exports have grown from 6.7 billion dollars to an estimated 22.1 billion dollars in 1976. Meanwhile, oil imports have increased from 3.4 million barrels per day (23 percent of consumption) in 1970, to 6 million barrels per day (37 percent of consumption) in 1975.

Imported oil cost the U.S. 27 billion dollars in 1975 ($125 per person) as compared with about 3 billion dollars ($15 per person) in 1970. The December meeting of oil exporting countries is expected to result in another increase of at least 10 percent.

"About one billion tons of residues are available each year from farms, forests, agri-business, and municipal wastes. If ways can be developed to convert these to valuable fuels, it could substitute for about 15 percent of our total energy needs," says Dr. Ed Soltes, research scientist with the Texas Agricultural Experiment Station.

"That 15 percent translates into the equivalent of several hundred million barrels of oil worth billions of dollars.

"And the beauty of it is that unlike oil and gas, agricultural residues are renewable; more grow each year.

"In the pulp and paper industry, for example, it's estimated that if forest residues can be utilized as energy, it will make the industry self-sufficient for energy and save the nation the equivalent of 100 million barrels of oil per year," says Soltes, a woods chemist in the Department of Forest Science at Texas A&M University.

Soltes heads a research team working on developing valuable energy uses for waste. The work is sponsored by the Experiment Station, the Center for Energy and Mineral Resources at A&M, and the St. Regis Paper Company.

You get an idea of the immensity of our annual agricultural residues from recent estimates that cereal straws amount to about 145 million tons; other plant residues, 240 million tons; and cow manure, 230 million tons.

"Most farmers probably raise enough residues to make them self-sufficient for energy if they could efficiently convert these materials into liquid fuels. The 'if' is what our team is working on," Soltes says.

"Use is being made of an old process called pyrolysis (heat in absence of air). It can change low-density residues into high-density liquid and solid fuels with higher energy contents.

"But the work doesn't stop there. The liquids and solid materials from pyrolysis are similar to pertroleum and coal in several respects. So, petrochemical and coal conversion technology will be borrowed to transform these materials into more desirable liquid fuels and chemicals.

"Despite the variability of the physical forms of agricultural and wood residues, there are many chemical similarities between them.

"Pyrolysis promises to be a leveling device that takes, for example, a mixture of corn cobs, cotton wastes, tree limbs or bark, and converts them into a uniform mass of material for energy and chemical products," Soltes says.

Currently, the research team is working on an assessment of residue availability in the State of Texas and on the chemical analysis of pyrolysis oils.

Who knows, we may live to see the day when agriculture producers are worrying about their "mesquite crop." □

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Delaware scientists study soil's K reserve

In a continuing effort to make fertilizer recommendations more accurate in the state with respect to potassium additions, a team of researchers is now studying the potassium release characteristics of some 29 Delaware soils.

Reporting recently on this research to an audience of more than 3,000 scientists at the joint annual meetings of the American Society of Agronomy, Crop Science Society of America and the Soil Science Society of America in Houston, Tex., University of Delaware soils specialist Dr. William C. Liebhardt described steps being taken by the team to determine a way to predict reserve potassium in the soil.

The routine procedures used in soil testing, explained Lebhardt, do not appear to indicate the potential potassium supply as well as some alternative procedures, since they only measure readily available forms — water soluble fertilizer and exchangeable ions.

Mineral potassium in the soil has until now been considered to be somewhat unavailable, but the soil specialist said that he and fellow researchers are finding that, at least on the sandy soils of Delaware, it is more accurate to describe this form of potassium as "slowly available."

The Delaware scientists are studying different soil test factors to determine the most effective way to measure the release of potassium from this material. The physical structure of the soil — sand, silt and clay percentages — as well as various clay minerals, do not appear to predict this.

The amount of potassium feldspar, a potassium mineral, in the sand fraction does appear to predict reserve potassium. Knowledge of the release mechanism of this reserve potassium potential added to traditional soil test procedures may improve the accuracy of fertilizer recommendation substantially with respect to crop response.

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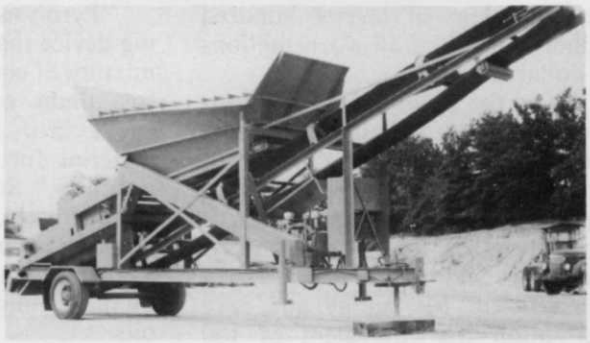

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0217® brand Fylking Kentucky bluegrass, the famous Swedish beauty, stands out because of its many improved qualities. An outstanding feature is fast germination, rapid growth that makes sod lifting possible sooner than other varieties. Superior density of rhizomes and root system makes an almost impenetrable sod that helps strangle weeds, prevents invasion.

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0217® brand Fylking Kentucky bluegrass is a shoo-in for first choice in any lawn seed mix. Specify the Swedish beauty, Fylking, at your local wholesale seed or sod distributor.

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Circle 127 on free information card

Creating colonial landscapes

The restoration of a colonial garden demands authenticity if the site is part of a museum or other place open to the public.

However, on private property the owner must decide whether he wants authenticity at the expense of improved varieties of flowers and shrubs. Will it be sufficient to create a "colonial feeling" without being entirely authentic?

One thing to avoid is forsythia. It was not introduced in American gardens until the 1830's and its use is a dead giveaway that the user doesn't know his plants. Lilacs, however, came to America with the earliest settlers and have been used ever since.

Avoid many evergreens such as yew rhododendron and juniper. They were used more extensively in the Victorian era. The colonial period specialized in roses, flowering quince, flowering almond, snowberry and sweet shrubs. Heavy plantings were not the order of the day in colonial times.

Most of the small trees and shrubs used in colonial landscaping had a dual purpose. They were planted to provide fruit for the table. Blossoms and fall color were incidental.

If you want a feeling of colonial authenticity, don't use a foundation planting. That also arrived in the Victorian era when foundations were high. In colonial times, foundations were close to the ground.

Herbs were rarely used in a special garden except in churches, monasteries or medical schools. Instead, they were usually mixed in with flowers and vegetables in the regular garden.

Colonial landscape plants were functional. Gardens were placed where they would capture spring sun or summer moisture, not with an eye to where they looked best. Walks were usually the shortest distance between two points.

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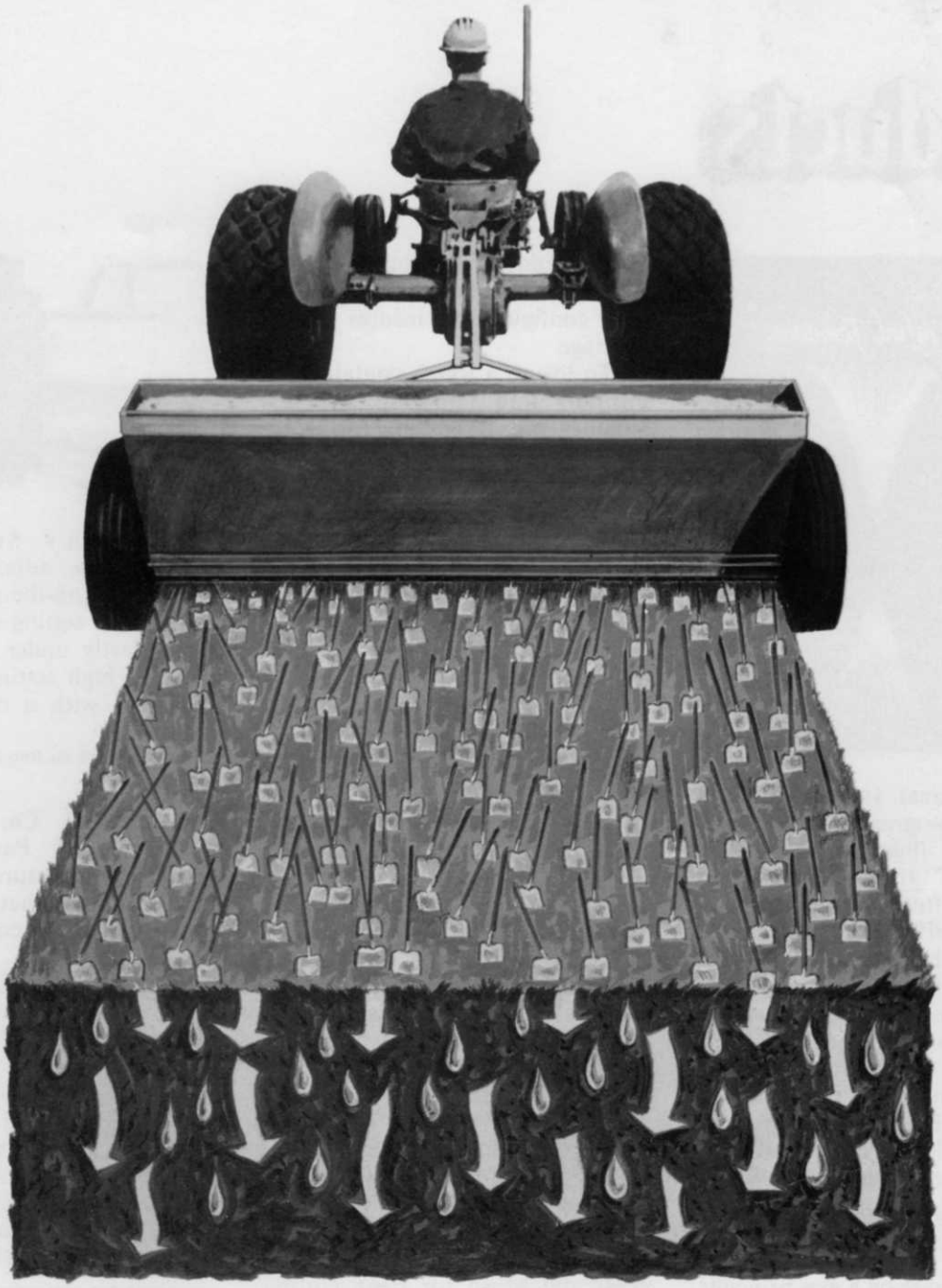

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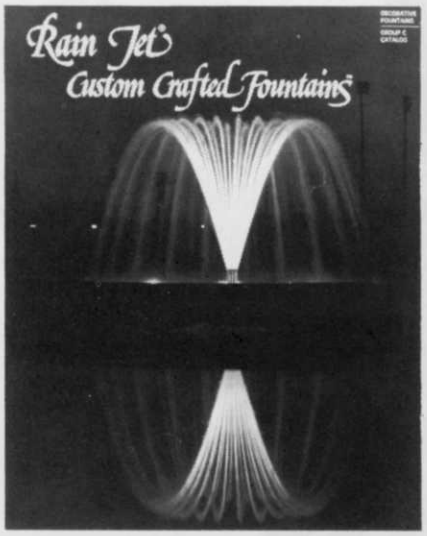


Over forty actual and unretouched full-color photographs in a new 16-page catalog illustrate Rain Jet's Group "C" line of patented "Custom Crafted" fountains. These new high efficiency fountains achieve breathtaking Water Sculpture® in an infinite array of motion, texture and color, and are designed for economical use of electric power.

This new Group "C" color catalog, accompanied by an 8-page specification brochure and a price list, is available free on request from Rain Jet Corporation, 301 South Flower Street, Burbank, California 91503.

Rain Jet "Custom Crafted" fountains operate on a new principle never before used in fountain design. Multichannel nozzles expand solid water streams into fountains of prismatic crystals many times larger than the original streams. Because of the light reflecting properties of these thousands of magnifying prismatic crystals, more brilliant illumination is produced with considerably less electrical energy.

Circle 701 on free information card

Nursery Supplies Inc. recently introduced their new Poly-tainer Classic line of plant containers. Sculptured sides not only make the container attractive, but direct the roots inward and down, resulting in healthy, well-nourished plants. Special drain hole configuration insures proper drainage.

To insure a tough container for shipping and handling, Nursery Supplies Inc. is manufacturing the Poly-tainer Classic line from higher molecular weight polyethelene than is used in comparable injection-molded nursery containers. This is the same durable material that is used on industrial containers.

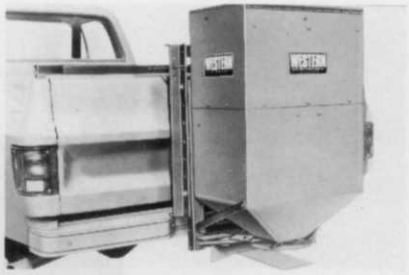
Circle 702 on free information card

Two models of rear mounted rotary mowers for cutting grass and light brush have been approved by the Simplicity Manufacturing Co. for application with its 19½ hp 9000 Series garden tractor. The equipment comes in 48 in. and 60 in. widths. All are attached by Category O three-point hitches for quick hook-up.

High speed suction blades lift the grass and brush for clean cutting. Full swivel caster wheels follow ground contour for uniform trim and avoidance of scalping. Free swinging blades retract on striking hard objects, protecting the blades and the entire machine. Cutting heights are adjustable from 1 to 9 in.

Circle 703 in free information card

Western Products has announced the addition of a new salt spreader to their line. The Super Spreader is a rear bumper mounted, hopper type unit designed for commercial and industrial ice melting. Spreading speed is variable, slow to fast, and is regulated by an in-cab rheostat. Salt is fanned to the side and rear of the vehicle from 5 ft. up to 50 ft.



Western's Super Spreader features an adjustable mounting height for on-the-job flexibility. A low height setting allows the salt to get directly under parked vehicles, while a high setting gives one-pass coverage with a maximum spread width.

Circle 704 on free information card

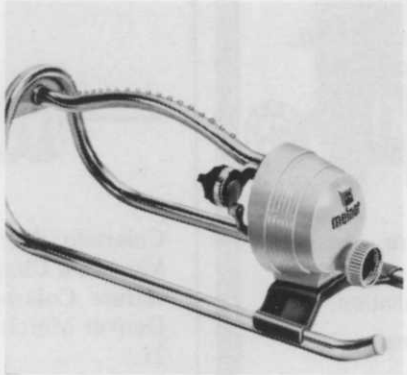
Allegretti & Co. announces the powerful new Paramount "Rota-Shear." It features a permanent magnet motor that produces higher torque, uses less current and cuts at lower rpm's to minimize cord breakage and wear. A full 16-in. cutting circle provides rapid and efficient mowing, trimming and edging.

The handle is contoured for comfort and features an instant "on/off" trigger switch. A husky handle adjusts easily to provide each operator with custom fit comfort and positive two-hand control.

Circle 705 on free information card

The "Rota-Shear" comes with 50 feet of .065" diameter nylon cutting cord. The cord is instantly adjustable, without tools, and replacement spools are easy to install.

Circle 705 on free information card



A new spreader in a 21-inch width, with a long-life epoxy finish and precision flow control, has been introduced by O. M. Scott & Sons.

The new model is wider than the previous one, allowing faster application of lawn fertilizers, control products and seed. The Scott's precision flow control and calibrated settings allow lawn care products to be distributed evenly and precisely.

The spreader is constructed of heavy-gauge metal, coated with a rust-resistant epoxy finish. Other features include bronze graphite bearings, a spring-loaded on/off control, and the ability to be recalibrated.

Circle 706 in free information card

Melnor Industries announces the addition of brass jet nozzles on two of their oscillating lawn sprinklers. The nozzles have been added to insure even water distribution and controlled spray.

The models involved are Nos. 525, which waters up to 2,200 sq. ft. in one setting, and 610, which covers up to 2,500 sq. ft. in a setting.

Circle 707 on free information card

Massey-Ferguson's new-from-the-grass up MF lawn tractor will ease yardwork and light farm chores. One of MF's family of five new lawn and garden tractors designed for performance and operator comfort, this 8-hp machine can be used with 36-in. side or rear sidcharge rotary mowers.

A wide range of specialized lawn care and snow removal attachments makes it a versatile machine. Inline transmission has five forward speeds and one reverse, with a speed range from 1.7 to near 6 mph. A foot pedal controls six different mower cutting heights.

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Circle 114 on free information card

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Meeting Dates

Colorado Nurserymen's Association and the Rocky Mountain Chapter of the International Society of Arboriculture Colorado Nursery and Shade Tree Conference, Denver Merchandise Mart, Denver, CO, Jan. 31 to Feb. 21.

Pennsylvania Nurserymen's Association, Pennsylvania Nurserymen's and Allied Industry Conference, J. O. Keller Conference Center, Pennsylvania State University, University Park, PA., Feb. 1-3.

International Society of Arboriculture Midwestern Chapter Meeting, Pfister Hotel, Milwaukee, WI, Feb. 1-3.

48th G.C.S.A.A. International Turfgrass Conference & Show, Memorial Coliseum Complex, Portland, OR, Feb. 6-12.

Rhode Island Nurserymen's Association, Annual Winter Meeting, Sheraton Islander Inn, Goat Island, Newport,R.I., Feb. 17.

Illinois Landscape Contractor's Association Seminar, Indian Lakes Country Club, Bloomingdale, IL, Feb. 17-18.

American Institute of Landscape Architects 20th Annual Convention, South Coast Plaza Hotel, Costa Mesa, CA, Feb. 17-19.

National Landscape Association and Garden Centers of America Joint Management Clinic, the Galt House, Louisville, KY, Feb. 20-23.

Urban Forestry Workshop, University of Wisconsin, Stevens Point, Mar. 3-4.

Nassau-Suffolk Landscape Gardener's Association 9th Annual Meeting, Farmingdale College, Farmingdale, NY, Mar. 5.

Wisconsin Landscape Federation Annual Conference, Marriott Motor Inn, Brookfield, WI, Mar. 6-7.

Northcentral Pennsylvania Turf School, Holiday Inn, Bradford, PA, Mar. 22.

Institutional Garden Design Show, Pacific Design Center, Los Angeles, CA, Mar. 25-28.

Virginia Weed Control Association Annual Meeting, Holiday Inn No. 2, Charleston, West VA, Mar. 29-30.

31st Annual Southeastern Turfgrass Conference, Rural Development Center, Tifton, GA, Apr. 11-12.

Southern California Turf and Landscape Institute, Anaheim Convention Center, Anaheim, CA., Apr. 20-21.

California Association of nfurserymen Annual Refresher Course, Cal Poly, San Luis Obispo, CA., June 1-3.

Oregon Seed Trade Association Annual Convention, Sunriver Lodge, Sun River, OR., June 10-12.

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When answering ads where box number only is given, please address as follows: Box number, c/o Weeds Trees and Turf, Dorothy Lowe, Box 6951, Cleveland, Ohio 44101.

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CONTRACTING FOREMAN: Work in Sun Belt of U.S. and most aggressive city in the southwest. Applicant must have experience in landscape construction, installation, and be knowledgeable of horticultural field. Year round position offers paid vacation, sick leave, eligibility for company insurance and job performance bonus plan. Applicant should have minimum 3 years experience, minimum age of 26, and possess ability to inspire and direct landscape workers. Send resume to Southern Landscaping, Inc., 6503 Mapleridge, Houston, Texas 77091.

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EXPERIENCED MANAGER in sales desires position — field, sales and management experience in Arboriculture, Horticulture and landscaping since 1957. Experienced in business administration, recruiting, hiring and motivating. Detailed resume on request. Box 162, Weeds, Trees & Turf, P.O. Box 6951, Cleveland, Ohio 44101.

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Charles Wollett, Manager, Sylvan Abbey Memorial Park, Clearwater, Florida

"A crew of 22 people takes care of more than 5,000 trees and shrubs at Sylvan Abbey. We have live oak, many species of holly, a few palm, some pine and jack oaks, azaleas, Formosas, vibernam and padocarpus. I really like how easy it is to use Jobe's Spikes. We're pleased with them."

In every type of climate and every kind of soil from sand to heavy clay, Jobe's Spikes have proved their effectiveness.

Jobe's Spikes are faster than drilling, better than broadcast fertilizer.

Use Jobe's® Tree and Shrub Spikes, and you feed trees in about one fourth the time and half the cost of drilling. A 5" tree takes about 5 minutes labor, plus $1.50 for 5 Spikes. Compare that to 30 minutes labor to drill holes, plus the time and cost to apply 10 pounds of fertilizer.

Jobe's Spikes are better than broadcast fertilizer because the plant food gets to the tree roots without danger of run-off, burned turf or excessive leaching.

Just pound them in... rainwater does the rest.

Jobe's Spikes are a pre-measured amount of fertilizer formed into easy-to-drive spikes by means of a patented binder. Jobe's Tree and Shrub Spikes are 16-8-8. Evergreen Spikes are 12-6-8. Fruit Tree Spikes are 5-15-15.

A plastic cap makes driving the Spikes easier. Just pound them into moist soil at the drip-line at the rate of 1 per inch of trunk diameter.

With Jobe's there's no bulky auger and generator to carry from job to job... no electric wires to tangle... no equipment to eat into profits with maintenance costs. A hammer is all the equipment you need.

Jobe's Spikes baby young trees.

"We lose probably from 12 to 24 trees per year to lightning or disease. These are generally older trees, and we always replace them. We use Jobe's Spikes with these new plantings to help them survive the shock of transplanting and develop a good root system."

Easy, economical, and effective.

University leaching studies have shown that Jobe's Spikes are as effective as fertilizer supplied to trees by conventional drilling methods. The report on the studies states, "The spike will supply nitrogen and potassium to a depth of at least 24 inches. The spike permits the movement of nutrients down through the tree root zone from the surface to the major root areas." Let us know if you'd like a copy of the complete report.

Charles Wollett is saving time and making money with Jobe's. How about you?

Jobe's Evergreen Spikes 12-6-8 and Fruit Tree Spikes 5-15-15 are now available in bulk. They can be combined for shipping with Tree and Shrub Spikes.

Call your local Jobe's distributor or order direct. $30 per case (105 Spikes) prepaid, 5 case minimum. 15 or more cases, $25 per case. 36 or more cases, $21 per case.

Jobe's®
TREE & SHRUB SPIKES

The easy method for professional tree care.
International Spike, Inc., 462 East High St.
Lexington, Kentucky 40508.

Circle 123 on free information card

"When we include baron* in our bluegrass mixture, we know we can depend on the results."

That's what George Koziarz of Synnestvedt Landscape, Architects and Contractors has to say about baron.

The Synnestvedt operation serves the North Shore of Chicago and is based on a design-build concept. The backbone of the company. . .landscape architecture and contracting. . .is supported by a 300 acre nursery, a fully-equipped tree care division, a commercial landscape maintenance division and two rapidly growing garden centers.

Ralph Synnestvedt, Jr., son of the founder, has a reputation to live up to and landscape contracting plays a big part in keeping this reputation.

"This is just one of the many examples of estate landscape development where we use BARON Kentucky Bluegrass. Our customers demand the best and we give it to them."

"Since we began using BARON there are fewer problems. That means fewer call-backs. . .BARON seems to be much more dependable."

"We naturally use BARON in our own mixtures sold at the Synnestvedt's Garden Centers. We also use Jamestown Chewings Fescue, Yorktown and Manhattan Perennial Ryegrasses in these mixtures."

"I think the first thing we found best about BARON was its quick germination. Our type business calls for a quick cover. . .BARON is what we call an aggressive grass."

"We can make sure a customer has a beautiful lawn, but we can't guarantee it will hold up under his maintenance methods. We know BARON helps keep the lawn looking good even with the owner's less-than-professional maintenance. . .I guess it's something like extra insurance."

If you're a landscape contractor, sod grower or golf superintendent, top quality turf is important to you. Lofts is ready to help with BARON, Majestic or Touchdown Kentucky Bluegrasses, Jamestown Chewings Fescue, Yorktown and Diplomat Perennial Ryegrasses, as well as other varieties.

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Loft Kellogg Seed Co.
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Lofts/New York
Albany, NY 12205
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Albany, OR 97321
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*U.S. Plant Patent #3186, Dwarf Variety

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